

Everyman's Encyclopædia

IN TWELVE VOLUMES

VOLUME FIVE

**Dramatic
Unities**

TO

Football

THE THIRD EDITION

THE THIRD EDITION
EVERYMAN'S ENCYCLOPÆDIA
IN TWELVE VOLUMES

VOLUME FIVE
DRAMATIC UNITIES — FOOTBALL.

EDITED BY ATHELSTAN RIDGWAY, LL.B.



THE THIRD EDITION

EVERYMAN'S ENCYCLOPÆDIA

IN TWELVE VOLUMES

VOLUME FIVE



RETROCONVERTED
B. C. S. C. L.

Handwritten note: This volume was converted from the original edition of 1911.



REFERENCE

LONDON: J. M. DENT & SONS LTD.
TORONTO: J. M. DENT & SONS (CANADA) LTD

J. M. DENT & SONS LTD.
Aldine House · Bedford St. · London

OR

J. M. DENT & SONS (CANADA) LTD.
224 Bloor St. West · Toronto 5

Made in Great Britain by
The Temple Press · Letchworth · Herts
and Spottiswoode, Ballantyne & Co. Ltd.
London & Colchester

ABBREVIATIONS

The titles of subjects, which are printed first in bold type, have been abbreviated within each article to the initial letter or letters.

ac., acre(s).
agric., agricultural.
ambas., ambassador(s).
Amer., American.
anct., ancient.
ann., annual.
arron., arrondissement.
A.-S., Anglo-Saxon.
A.V., Authorised Version.
b., born.
Biog. Dic., Biographical Dictionary.
bor., borough.
bp., birthplace.
Brit., British.
C., Centigrade.
c., about.
cap., capital.
cf. compare.
co., county.
com., commune.
cub. ft., cubic feet.
d., died.
Dan., Danish.
dept., department.
dist., district.
div., division.
E., east ; eastern.
eccles., ecclesiastical.
ed., edition ; edited.
e.g., for example.
Ency. Brit., Encyclopædia Britannica.
Eng., English.
estab., established ; establishment.
F., Fahrenheit.
fl., flourished.
fort. tn., fortified town.
Fr., French.
ft., feet.
Ger., German.
Gk., Greek.
gov., government.
Heb., Hebrew.
hist., history.
horticult., horticultural.
h.p., horse-power.
hr., hour.
i.e., that is.
in., inch(es).
inhab., inhabitant(s).

is., island(s).
It., Italian.
Jap., Japanese.
jour., journal.
Lat., Latin.
lat., latitude.
lb., pound(s).
l. b., left bank.
long., longitude.
m., mile(s).
manuf., manufacture.
min., minute(s).
mrkt. tn., market town.
MS., manuscript.
mt., mount ; mountain.
N., north ; northern.
N.T., New Testament.
O.E., Old English.
O.F., Old French.
O.T., Old Testament.
oz., ounce(s).
par., parish.
parl., parliamentary.
pop., population.
prin., principal.
prof., professor.
prov., province ; provincial.
pub., published ; publication.
q.v., which see.
R., riv., river.
r. b., right bank.
Rom., Roman.
R.V., Revised Version.
S., south ; southern.
sec., second(s).
sev., several.
Sp., Spanish.
sp. gr., specific gravity.
sq. m., square mile(s).
temp., temperature.
ter., territory.
tn., town.
trans., translated ; translation.
trib., tributary.
univ., university.
urb., urban.
vil., village.
vol., volume.
W., west ; western.
Wm., William.
yd., yard.

The article ABBREVIATIONS contains a list of those in general use. See also ABBREVIATION (music) and ELEMENTS (chemical symbols).

D

Dramatic Unities, three rules of dramatic construction enunciated by Aristotle, observed by the Fr. dramatists, but ignored by Shakespeare, that (1) a play should represent what takes place within a period of eight hours, (2) there must be no change of locality, and (3) there must be no minor plot.

Dramburg (Polish, *Drawsko*), tn. in the prov. of Pomorze, Poland, formerly of Pomerania Germany, with cloth manufs. Pop. 6100.

Drammen, seaport of Norway, 33 m. S.W. of Oslo by rail, at the head of Dramsfiord, through which the broad Dramslv empties its waters into Oslo Fiord. Timber, floated down from the upland forests, and wood pulp are the staple exports, saw-milling and the manuf. of paper, and ship building and cotton spinning being the other active industries. Pop. 26,000.

Drane, Augusta Theodosia (1823-91), Eng. writer. Having been influenced by Tractarian teaching at Torquay, she became a Rom. Catholic (1850). In 1852 she joined the third order of St. Dominic, and was prioress of Stone Convent, Staffordshire, 1872-81. Her essay questioning the morality of Tractarianism was attributed to Newman. Other works are: *The History of St. Dominic* (1857), *The Knights of St. John* (1858), *Three Chancellors* (1859), *Life of St. Catherine of Siena* (1880), *Songs in the Night* (1876, verse). See B. Wilberforce (ed.) *Memorial of Mother Francis Raphael*, 1895.

Drang Nach Osten, expressive phrase given to the Ger. policy of forcing a way to a foothold in the E. through the Balkans. In the First World War they had by 1916 so far trans. the dream into a reality as to secure uninterrupted and unthreatened communication and commerce with Constantinople, over the two main arteries of Asiatic Turkey, and also with the cities of Damascus, Mecca, Jerusalem and Bagdad. In the Second World War Ger. armies reached and held the Balkans for sev. years. (See also BAGDAD; BAGDAD RAILWAY.)

Drant, Thomas (d. c. 1578), Eng. divine; the first Eng. metrical translator of Horace. He won fame by his sermons before the court at Windsor in 1569, and to the congregation at St. Mary Spital, London, in 1570, both pub. in the same year. He wrote verses in Eng., Lat., and Gk. (1564), his works including: *A Medicinable Morall* (1566), *Sylva* (1576), and a trans. of Horace, *his Art of Poetrie, Pistles, and Satyrs. Englished* (1567).

Draper, Mrs. Elizabeth (1744-78), is best remembered for her association with Sterne, an association which there is no doubt never went beyond sentimental flirtation. The daughter of May Selater and an Anglo-Indian official, she married

at the age of fourteen Daniel D. of the E. India Company's service, a man much older than herself. Coming to England in 1776 for her health she met Sterne and was flattered by the attention of the great man. When she returned to India, he wrote regularly to her, and began the *Journal to Eliza*, which, owing to Sterne's death early in 1778, never reached her. In 1772 she left her husband, returned to England, and settled at Bristol. She was buried in Bristol Cathedral. The full story of her life is told, and her letters are printed, in the *Life of Sterne*, by 'Lewis Melville' (L. S. Benjamin) (1911).

Draught (from A.-S. *dragan*, to draw), current of air, in particular one which is induced or artificially forced to support combustion. *Natural D.* is produced by a chimney, through which the heated gases rise by reason of their lesser density, thus inducing a current of cool air through the fire. *Forced D.* may be produced by driving air at more than atmospheric pressure through the fire by means of fans. In locomotive boilers the D. is increased by turning the exhaust steam into the chimney, thus increasing the velocity of the current of air.

Draughts, generally conjectured to be one of the most anct. of table games. A game of this kind was known to the Gks. and Romans, and various monuments represent the anct. Egyptians as engaged in a similar amusement. It became common in Europe during the sixteenth century. The game is played by two persons on a board similar to that used for chess, i.e., square board containing sixty-four squares, checkered in black and white alternately. Each player has twelve 'men' in the form of circular discs, one set being black and the other white. These men are arranged on the three rows directly before each player. They may be placed either on the black or the white squares, but the extreme left hand square on the board before each must always be occupied. Lots are cast to decide which colour each player shall have, and black plays first. The players then change colours after each game. The men move diagonally, one square at a time, so that play continues entirely on squares of one colour. If a man comes next to a man of the opposite side he is unable to move past unless there be a vacant square on the other side of his adversary's man, in which case he must jump over this man and occupy the vacant square, removing his enemy's man from the board. If, after taking a man in this way, it is possible for him to jump another man, taking this one also, he must do so in the same move. In the rare event of a player neglecting to take when the opportunity is given him, his adversary may either take the piece with which the capture would have been made (a pro-

ceeding known as 'huffing'), or compel him to revoke his last move and perform the capture. He may also, if he wish, allow the move to stand. If a player gets one of his men into his adversary's back line, this man becomes a 'king,' and is 'crowned' by having another man of the same colour put on top of him. The king may move either backwards or forwards, whereas the ordinary men can move only forwards, but this is the only privilege he has. He captures in the same way as ordinary men, except for this one difference. If a player touches a piece, he must move it if possible. The game is won by a player removing all his adversary's men from the board or by his placing them in such a position that they cannot move.

Hyderabad, and E. to the Bay of Bengal. It includes also N. Ceylon, and scattered tribes are found in other parts (see Cust and Constable's linguistic and racial maps). The more important languages in the D. group are Telugu, Tamil, Kanarese, Malayalam, Tulu, and those of ruder tribes, such as Gōndi, Kōta, Kurux, Kul, and Rajmahal. The tribes of the N. have gradually become Hinduised and their language has been considerably modified by the Aryan forms of speech. The Brāhūis of Baluchistan, however, still speak a D. dialect. The D. languages seem to have formed a quite distinct group, independent of the Aryan or Indo-Germanic. There are about a dozen different tongues comprised in the group,



DRavidian TYPES OF INDIA

Left to right: Scytho-Dravidian (Tamil), Aryo-Dravidian (Hindu), and Mongol-Dravidian (Bengali)

See J. Sturges, *Guide to the Game of Draughts*, 1800; A. Anderson, *Game of Draughts* (revised by R. McCulloch), 1888; F. Tescheleit, *Master Play of the Draught Board*, 1926; Lees' *Guide to the Game of Draughts* (revised by J. W. Dawson), 1930.

Drave (Ger. *Drau*), riv. of Austria and the second largest trib. of the r. b. of the Danube. Rising in the Tyrol at an altitude of over 4000 ft., it flows 449 m. before its final confluence with the main riv., 13 m. E. of Osjeck. With an E. or S.E. course it traverses Carinthia, Styria, and Slovenia by way of Maribor (Marburg) forming later in its course the boundary between Hungary and Yugoslavia. It was through the long valley of the D. that the Huns and Slavs reached the Alps. Of the many affluents the largest is the Mur on the left. Steamers can go up only as far as Bâros (95 m.).

Dravidians (Sanskrit *Drāvida*, or *Drāmīda*), name of a large group of Indian peoples (non-Aryans) and their family of languages. Their main ter. lies chiefly in S. India, extending upwards from the peninsula N. to the Arabian Sea, about 100 m. below Goa, thence along the W. Ghat to Kolhapur, N.E. through

differing from each other radically and not merely in dialect forms, and yet derived from a common D. source. Tamil, Malayalam, Kanarese, and Telugu are the chief literary languages. Inflections are expressed by 'agglutination,' or affixing particles to primary roots or bases, but these additions do not blend with the roots as in the case of inflectional languages. Nouns are of two classes, high-caste and casteless (for rational and irrational beings respectively); gender being distinguished only in the former. A peculiarity is the double form for the first person plural of the personal pronoun, for including or excluding the person addressed. There are no relative pronouns, relative participles being used instead. A separate negative conjugation, usually with only one tense, exists for verbs. D. tongues were spoken by some 57,497,000 people according to the census of 1901. The D. were probably the aborigines of the Deccan. They are among the most primitive of Indian types the Todas of the Nilgiri Hills representing a very low stage of civilisation. They are mostly very dark-skinned, with wavy, black hair (not woolly), and are possibly descendants

of the Negritos of Malaysia. Their religion consists partly in nature-worship, partly in creeds adopted from more civilised tribes. See E. Hultsch, *S. Indian Inscriptions, Tamil and Sanscrit*, 1809-95; R. Caldwell, *A Comparative Grammar of the Dravidian Languages* 1856, 1875; G. A. Grierson, in *Linguistic Survey of India*, iv. 1904; A. H. Keane, 'Race and Speech' in *East and West*, 1905; W. R. R. Rivers, *The Todas*, 1906; E. Thurston and K. Rangachari, *Castes and Tribes of Southern India* (Gov. Press, Madras), 1909; G. Slater, *The Dravidian Element in Indian Culture*, 1924; L. K. Ananta Krishnalyer, *The Mysore Tribes and Castes*, 1928-31; W. Koppers, *Ethnologische Probleme Vorderindiens*, 1946.

Drawback, see CUSTOMS DUTIES.

Drawbridge, in anct. times an invariable adjunct of a castle. It was a bridge hinged at one end and free at the other, so that it could be drawn up or let down as required. The original form was the lifting D., used to span the moat of a castle; this form is used now to provide a passage over canals, etc. The swing-bridge is a D. which revolves in a horizontal direction.

Drawing, the art of representing in line forms seen or imagined. It can be done in many mediums on a suitable surface. The medium can be pencil, pen, brush, graver, burin (tool used for engraving on copper). The surface can be paper, wood, linoleum, copper, stone, etc. D. can be placed under two broad headings, (1) free drawing and (2) mathematical drawing.

(1) This involves the use of *free expression* and, in its finest examples, a high degree of skill and æsthetic taste. In advanced D. the representation of a third dimension needs an understanding of light and shade and reflected light, also a knowledge and appreciation of lineal and aerial perspective. Lineal perspective is the diminution in size of objects as their distance increases. Aerial perspective is the change of colour (and, or, lack of distinctness), of objects caused by atmospheric conditions, as their distance increases. The application of D. to surfaces such as wood, linoleum, copper, stone, etc., need further technical skill and are dealt with under the headings of wood-cut, lino-cut, engraving, etching, lithography, etc. A thorough knowledge of D. is the only true basis for the painting of pictorial subjects. (See also CARICATURE.) G. M. Ellwood, *Pen Drawing*, 1927; A. Gladstone-Jackson, *The Right Way to Human Figure Drawing and Anatomy*, 1948.

(2) Mathematical D. is essentially utilitarian and needs *practical* skill and, in advanced work, involves knowledge of physical laws and construction detail. The ability to use D. instruments such as rulers, scales, compasses is required. In architecture, the ability to prepare accurately measured and scaled plans, elevations, sections and isometric drawings is essential. A knowledge of perspective (lineal) is also useful. Mathematical drawing is used in connection with aircraft construction, shipbuilding, loco-

motive building, automobile construction and many other industrial undertakings. See also ENGINEERING DRAWING.

Drawsko, see DRAMBURG.

Drayton, Michael (1563-1631), Eng. poet, b. at Hartshill, Warwickshire; entered the family of Sir Henry Goodere, near Tamworth, as a 'proper goodly page' and seems to have settled in London about 1590 or 1591. Biographical details are lacking. There is some evidence that Anne, daughter of Sir Henry Goodere, afterwards wife of Sir Henry Rainsford, was 'Idea' who inspired D.'s first pastorals, *Idea, the Shepherd's Garland* (1593) and his first sonnets, *Idea's Mirror*, *Amours in Quatorzains* (1594). Another patroness was Lucy Harrington, who became Countess Bedford. To her before her marriage D. dedicated his *Legend of Matilda and Endimion and Phoebe* (1595), *The Legend of Robert* (1596) and *England's Heroical Epistles* (1597) and also dedicated to her. Between 1597 and 1602 D., by that time in high repute, was doing theatrical hack-work for Henslowe (q.v.) and among his other and earlier associates were Dekker and Munday and, somewhat later, Webster and Middleton. In his *Idea, the Shepherd's Calendar*, he sang his love sorrows and in *Idea's Mirror* (originally 52 sonnets but later expanded to 100) 'Idea' is again used to designate the lady of his adoration. D.'s historical poems began with the *Legends* of historical personages, *Piers Gaveston* (1593), *Matilda* (1594), and *Robert Duke of Normandy* (1596). In the heroic poem *Mortimeriados* (1596) his theme was again the political troubles of Edward II.'s reign. Written in rhyme-royal stanzas, this, his first poem of length and importance, appeared as *The Barons' Wars* in the revised ed. of 1603. Written in *ottava rima* in its remodelled form, it is a rather tedious narrative of episodes in the Wars of the Roses and loses by comparison with Marlowe's dramatic treatment of the subject in *Edward II.* But there are passages of noble rhetoric on the liaison of Mortimer and the Queen, culminating in a sumptuous description of the chamber in Nottingham Castle where the lovers are surprised by Prince Edward. The inequalities and rudeness of style in this narrative disappear in D.'s *England's Heroical Epistles* (1597), historical poems written on the model of Ovid's *Heroides* and containing some of his very finest lines. Equally national in spirit is his ballad of *Agincourt*, first pub. with his odes in *Poems Lyrical and Pastoral* (1606). Few, however, read with pleasure his ponderous *Poly-Olbion*, which, according to Francis Meres, he had begun in 1598, and which he himself aptly describes as a 'Herculean toil.' For in it he undertook a 'chorographical description' of everything of antiquarian and topographical interest throughout Great Britain. This vast work, barren and wearisome to a degree, at least demonstrates the unsuitability of the Fr. classical metre (couplets of Alexandrines) for Eng. verse. Yet D. could write a poem of the grace and charm of his *Nymphidia* (1627), a mock-

heroic fairy poem which is the inspiration of many of Herrick's lyrics; the pastorals *The Shepherd's Sirena* and *The Quest of Cynthia*, love idylls, and one splendid sonnet, 'Since there's no help, come let us kiss and part,' which Rossetti proclaimed 'almost the best in the language, if not quite.' Among his last poems were *The Muses Elizium* (1630) and a few *Divine Poems* on O.T. themes, in decasyllabic couplets. The editing of *The Works of Michael Drayton* in five vols. with introductions and notes, etc., by K. Tillotson and B. H. Newdigate, and completed in 1941, is a masterpiece of minute and comprehensive scholarship. See also O. Elton, *Michael Drayton: a Critical Study*, 1905; B. H. Newdigate, *Michael Drayton and His Circle*, 1941.

Drayton-in-Hales, see MARKET DRAYTON.

Dreadnought, Brit. battleship, 490 ft. long, of 17,930 tons, with speed of 21 knots. The first of this since famous class was launched and completed at Plymouth (1906), the designs having been accepted in 1905. It gave its name to a class of modern battleship, and was in fact a synonym for an ironclad or battleship carrying ten 12-in. guns, and a number of 12-pounder quick-firing anti-torpedo-boat guns and propelled by steam turbines. See also BATTLESHIP.

Dreaming, may be defined as the manifestation of a conscious process during sleep. During sleep conscious activity is, under ordinary circumstances, entirely in a state of suspense; the sensory nerves no longer perform their usually active duties, the action of the heart becomes slower, the brain is at rest, and during this period gets rid of the waste tissue and is restored to fresh activity. Our faculties, however, need not all be in an equal state of inactivity; it is possible to perform a number of quite ordinary actions whilst in a state of sleep, e.g. soldiers have often marched for some considerable distance whilst, to all intents and purposes, in a deep sleep. We dream, then, principally because the suspension of mental activity is not complete. It has been held that sleep is never so profound as to be dreamless, but this is a theory which cannot be proved. On the other hand, it has been held that we dream only during those periods of falling asleep and awakening during which our mental activities are in a semi-conscious state. This, again, is a theory which cannot be actually proved, but may to some extent be disproved, since it is well known that manifestation of dreaming has been noticed in cases where the subject was in a deep sleep. Further, in many cases sleepers suddenly awakened have aroused themselves with difficulty from a dream. That all our powers of judgment are inactive during a dream cannot be held as true, since on occasion we find that we desire to prolong a dream of peculiar happiness, whilst we can arouse ourselves from one which terrifies us by its horror. Dreams whilst resembling in many ways the process of conscious activity, on the other hand differ characteristically from the experiences of our

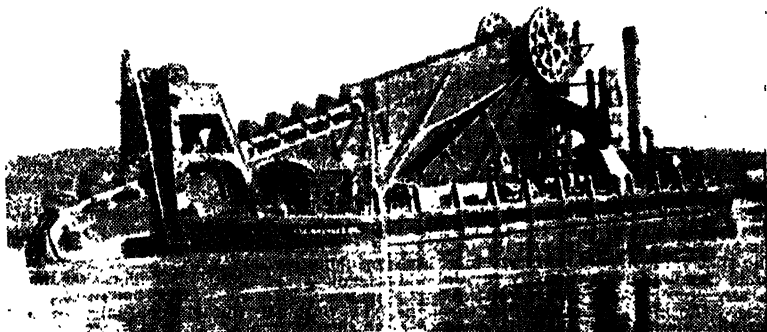
waking life. Time, space, and order are not to be found during our dreams, though on examination they are seen to possess an inner coherence. Also the events which occur to us during these periods leave a great impression on our mind for the time being, although we may on awakening remember little or nothing of the experiences undergone during sleep. That the activities of the day, or the immediate time preceding, have influence on our dreams is undoubted. Incidents trivially passed over during our waking experience form often the basis of a dream, details forgotten in the routine of the day will occur time and time again during sleep. Problems in mathematics have been solved, legal decisions given, and even sermons have been produced during sleep, whilst we may here quote the famous example of Coleridge's *Kubla Khan* as a poem which was composed during sleep and which was written immediately on awakening. All creative writers draw on the material of dreams, often undisguisedly. Experiments have been made in order to test the effect of the senses in dreams, and it has been proved that dreams can easily be related to the immediate sensory cause. Certain drugs, such as opium, and hashish, have peculiar effect upon the character of dreams whilst the physical state of the body can often give peculiar effect also to the dreams. The nightmare, or 'anxiety dream,' may be due to the presence of undigested food in the stomach, other uncomfortable dreams may be caused by inability to breathe properly, or by an uncomfortable position in sleeping. The state of the brain is also an important factor. Dreams are in some cases not only thought out but actually acted by the dreamer: cases of this kind, such as sleep-walking, the performance of acts during sleep which the sleeper has no recollection of after waking, sleep-talking, are all phenomena of this state of mind. Amongst the ancients people dreams were regarded as of divine origin, the interpretation of dreams took an active part in the life of the nation, and the 'seer' was regarded with awe by the people of the nation. The whole matter of the interpretation of dreams was put on a scientific basis in the twentieth century by the work of Sigmund Freud (*q.v.*) and his followers. The dream is regarded by Freud and the psychoanalysts of all schools as the royal road to the 'unconscious' mind, the correct diagnosis of the state of the latter being the first step in mental therapeutics. See S. Freud, *An Interpretation of Dreams*, 1900; R. Hine, *Dreams and the way of Dreams*, 1913; and J. W. Dunne, *An Experiment with Time* (a non-psychoanalytic explanation of dreaming, 1927). See also PSYCHOANALYSIS.

Drebbel, Cornelius van (1572-1634), claimed, erroneously, to have been the joint-inventor with Santorio of the thermometer, but was famous among his credulous contemporaries rather for his empirical inventions, such as a boat for rowing under water, in which the pas-

senger could read without artificial light, than for his real discoveries. A pensioner of Emperor Rudolph II. and tutor to Ferdinand II.'s son, he owed his release from imprisonment in Austria (in consequence of a revolution) to James I. of King. He passed the rest of his life in England. Besides his water thermometer he discovered a bright scarlet dye, afterwards used with effect in the Gobelin's manufactories, and devised improvements in the microscope and telescope.

Dredging Machines, machines for cleaning and deepening the entrances to and channels of rivers, canals, docks, and harbours, by removing the mud or rock from the bottom. There are several kinds

projects downwards through a well in the float, and being held by a chain which runs around a 'topping lift' which enables the ladder to be lowered or raised to the depth required. This ladder is usually placed in the centre of the float, although there are *double ladder machines*, the two ladders being side by side, and *side ladder machines*, in which the ladders project over the sides of the float so that they may be used close to dock-walls, etc. In all cases, however, an endless chain of buckets passes round the ladder which is fitted with tumblers at each end. The top tumbler is moved by a system of steam gearing, so causing the buckets to rotate. Meanwhile the machine is moored by bow



BUCKET-LADDER DREDGER

Lyne Improvement Commission

of dredgers, which can be divided into three main classes: (1) *The grab dredger*; (2) *the bucket-ladder dredger*; and (3) *the suction dredger*.

(1) *The grab dredger* is used only where the amount of mud is small, or where time is of not too great importance. It consists of a pair of heavy iron jaws hinged together at the top, and slung by chains over a crane, which is usually mounted on a float, although it may be worked sometimes from the shore. The 'grab' is lowered to the sea bottom with the jaws held open by means of side chains. As the hoisting chain is slackened so under its own weight the 'grab' sinks into the mud. The side chains being then slackened and the hoisting chain drawn upwards, the two jaws close together and so bring up a quantity of mud with them. By means of the crane, then, the 'grab' is hauled up and swung so that the mud may be discharged into a barge; the jaws being opened again by means of the side chains.

(2) *The bucket-ladder machine* consists of a long ladder, one end of which is fixed high above the deck. The other end

and stern cables with further cables over both bows and quarters, and as the buckets revolve so cutting mud up from the bottom, the chains on one side are hauled in while the others are slackened. So the D. M. is gradually drawn right across the bank to be cut. When this has been done, the D. M. is hauled a little further forward, and the process repeated by hauling in the chains on the other side, so that the machine is drawn back across the bank. As the buckets are turned over by the top tumbler they naturally discharge the mud into a shoot. Usually this shoot projects over the side, and so the mud is discharged into 'hopper' barges, fitted with trapdoors on the bottom held up by chains, which on being suddenly released drop the cargo. Sometimes the D. M. are built with a hopper well, so that they carry their own mud and deposit it. They are then known as hopper dredgers. It is evident, however, that such hopper dredgers lose time when compared with the others, for they have to proceed to the 'dumping ground,' whereas the ordinary dredger is continually dredging and filling other 'hopper'

barges. Not only that, but time is wasted in picking up the moorings each time, and this is not always an easy matter.

(3) *The suction dredger* is fitted with a centrifugal pump, with a flexible suction pipe, which is dropped to the sea bottom. Through this the sand or mud is pumped up and discharged either into other barges or into its own hopper well, if it is provided with one. See E. C. Shankland, *The Dredging of Harbours and Rivers*, 1931.

Dred Scott Case, The, most important decision of the U.S.A. Supreme Court, handed down in 1857, and one of the contributing causes of the Civil War. Dred Scott was a Missouri slave, taken by his owner in 1834 into Illinois (where slavery was prohibited), and later into Minnesota (then part of the Louisiana Purchase). Dred Scott had married and had two children while on free soil, but he and his family were later taken back to Missouri.

In 1848 he sued for his freedom on the ground that his residence in a free state had given him the standing of a freeman. The Supreme Court of Missouri held that on return to Missouri the status of slavery re-attached to him and that he had no standing in court, but the U.S.A. Circuit Court before whom the case came in 1850 decided that as a citizen of Missouri Dred Scott had standing in court, but that he was still a slave.

The Case was argued before the Supreme Court of U.S.A. in 1855 and 1856, and the decision (not unanimous) that Dred Scott was not a citizen, that the Constitution guaranteed security in private property and that value of such property in a slave could not be constitutionally invalidated in any state, even by the Federal gov., roused the most intense feeling throughout the country and made it clear that slavery would not be abolished along constitutional lines. Chief Justice Taney had not only remanded Scott to slavery, but had gone out of his way to proclaim the Missouri compromise void and denied the right of Congress to make slaves or their descendants citizens. He practically said that the negro had no rights that white men were bound to respect.

Dreiser, Theodore (1871-1945), Amer. novelist and playwright, b. at Terre Haute, Ind., twelfth child of poverty-stricken and piously Catholic parents of Ger. descent. Educated at common schools, and at Indiana Univ. He was on the staff of the *Chicago Daily Globe*, 1892; dramatic editor and travelling correspondent of the *St. Louis Republic*, 1893-94; editor of *Smith's Magazine*, 1905-6; managing editor of *Broadway Magazine*, 1906-7; editor-in-chief of *Butterick* pubs., 1907-10. His first novel was *Sister Carrie* (1900), which was suppressed and denounced as immoral because in it unchastity received no punishment. His next was *Jennie Gerhardt* (1911). Then came *The Financier* (1912), and *The Titan* (1914)—two parts of a trilogy intended to portray the career of Charles Tyson Yerkes, the traction millionaire. Other works include: *A Traveller at Forty* (1913), *The Gentus*

(1915), *Plays of the Natural and Supernatural* (1916), *Twelve Men* (1919), *The Hand of the Potter* (1919), *Hey Rub-a-Dub-Dub* (essays and philosophy, 1920), *The Colour of a Great City* (1923), *An American Tragedy* (1925), *Moods* (verse, 1926), *Chains* (lesser novels and stories, 1927), *A History of Myself* (1931), *Thoreau* (1939), *America is Worth Saving* (1941), and *The Bulwark* (posthumously, 1946).

Drenthe, Dutch prov. S. of Groningen and Friesland. Area 1030 sq. m. Pop. 220,000. Cap. Assen.

Dresden, cap. of Saxony, Germany, 111 m. S. of Berlin by rail and 70 m. E.S.E. of Leipzig, in the pleasant valley of the Elbe. On the l. and s. b. lie Friedrichstadt and Altstadt (the old tn.), from which, however, most of the picturesque medieval houses had been swept away even before the First World War. In 1945, however, allied bombers reduced the buildings round the Altmarkt and Neustädtermarkt to empty shells. Friedrichstadt and Altstadt are connected with Neustadt and Antonstadt by a spacious bridge which replaced the beautiful Augustusbrücke (1727-31), demolished in 1906. The riv. is also spanned by the Carola, Albert, Marlen, Loschwitz and railway bridges. The industrial quarters greatly increased during the inter-world-war decades owing to the coal-mining in the dist. of which D. is the heart. Before the Second World War there were more than 8000 undertakings employing over 200,000 workpeople (the cigarette industry was the oldest), other manufs. including chocolate, photographic apparatus, machines, stone ware, glass, lead, and chemical preparations. The technical high school had nearly 3000 students. The national library contained nearly 700,000 volumes. D. was known to the world as a repository of fine art. Its one-time famous collection of pictures in the Zwinger (D.'s Museum and Art Gallery, erected in 1711-22 by Popelmann, architect to Augustus the Strong) including Raphael's priceless 'Madonna di San Sisto,' Correggio's 'La Notte' and 'Mary Magdalene,' 'The Adoration' of Paul Veronese, Titian's 'Tribute Money,' and paintings by Claude Lorraine, Rembrandt, Van Dyck, and Rubens, was begun by Augustus I., but its true founder was Augustus III., who in 1745 bought the unique Modena Gallery containing 2400 pictures by It. and Flemish masters. Thus, there was every justification for Herder's reference to D. as the 'German Florence.' It was from D. that rococo art spread in the eighteenth century, the Rom. Catholic Hofkirche (1739-51) and the Zwinger, which before 1939, housed sculptural, zoological and mineralogical collections, being excellent illustrations of this style. The Zwinger, however, was reduced in 1945 to a shell and its delicate charm broken and blasted in the air raids of Feb. 13-14 when so much else in D. was also destroyed, including a great part of the catholic Hofkirche. Fortunately the galleries of the Zwinger were empty, the pictures having been removed to safety early in the war, as also the unique col-

lection of porcelain (over 15,000 examples) in the Johanneum where also was the Historical Museum. In the Jap. palace (1715) were accommodated the national library and the collection of classical sculptures and antiquities. Besides the handsome Schloss or royal palace (1530-1535) in the Ger. Renaissance style, other noteworthy buildings included the magnificent Hoftheater (1871-78) designed by Semper, the domed and lanterned Frauenkirche (1726-34), the twin-spired Sophienkirche (the Protestant Court Church) (1351-57 and later) and a second royal theatre. The Schloss was left in ruins in the raids of 1945; the famous Opera House was left roofless and burnt-out. There was scarcely anything left of the Frauenkirche. The Sophienkirche was practically destroyed, though the steeple remained standing; the new Town Hall was left largely in ruins. The statue of Frederick Augustus of Saxony, however, still stood in front of the ruins of the Frauenkirche after the raids. The steeple of the Dreikönigskirche was left standing. When the Russian troops of Marshal Konev entered D. on May 8 (1945) they found the Prager, Augustus, Moritz, and Ring Strassen to be mere paved roads between ruins, their footways heaped with stone blocks. The centre of the city was dead. Six e.g. mi. of the inner tn. were in ruins. The destruction extended to some of the suburbs in the S. and W. and some 27,000 houses and 7000 public buildings were completely destroyed, among them half the churches and half the schools. D. before the war was further remarkable for its fine squares, its statues, including the Rietschl monument by Schilling on the Brühl Terrace, and its public pleasure gardens, especially the Grosser Garten. The well-known Conservatoire of Music, and the splendid orchestra in the court theatre, with which were associated such master-musicians as Weber and Wagner, served as public attractions for visitors, whilst in summer-time pleasure-steamers conducted them along the riv.'s banks. In the 1930's D. had the largest garrison in Germany. It is the headquarters of the Lutheran Church in Saxony. In 1270 Henry the Illustrious chose D. as his cap., and its prosperity increased rapidly when in 1485 Saxony fell to the Albertine line. But again and again the city has been devastated by fire and sword, as during the Seven Years' War (1756-63), and Napoleon's campaign of 1813, when he won his last great victory, in Dresden, at the cost of 15,000 dead and wounded and 12,000 prisoners to the allies and a loss of 10,000 to the Fr. In 1849, from May 3-6, there was desperate street fighting and the old opera house was burnt down. D. was occupied for a time by the Prussians in 1866. Most of the destruction in the Second World War happened in one night, that of Feb. 13-14, 1945, when there were two raids on the city, which was then full of refugees who had streamed in from the E. before the advancing Russian armies—in Aug.-Sept. 1945, 3,000,000 refugees passed through D. In the two attacks, and mostly in the first, 25,000

people were killed and 30,000 more injured. Thousands were trapped in cellars of burning buildings. According to the Gers. the tn. had no anti-aircraft defences. The rebuilding of D. will take 12 years. Such of the city's architectural monuments as can be restored will be rebuilt. The opera house was restored during 1945-46 and the Schloss and Hofkirche will rise again, but most of the inner tn. will have little resemblance to its past form, for restoration would in any case be impossible. Pop. 650,000.

Dressmaking, the art or occupation of making dresses. The name dress is usually applied to any outer, complete feminine garment except a coat and skirt; it is sometimes restricted to a bodice and skirt, made up separately and later joined together at the waist, as distinguished from a robe or gown, which is generally made in one garment. The pattern of dresses depends entirely on the prevailing fashion, but the general characteristics of dresses suitable for different occasions are, as a rule, very similar. Day, or walking dresses, are usually shorter than formal afternoon or evening dresses. Day dresses are made of firm and durable material for winter wear; and cotton, linen, or rayon, for summer wear. Formal afternoon dresses are made of fine woollens, velvets, or silks (natural or synthetic); while evening dresses are usually made in taffetas, satins, silks (natural or synthetic), tulle, lace, etc. The materials best suited for draping are the softer silks and woollens, etc., whereas taffetas, brocades, moire, tulle, etc., stand away from the figure and look well in very full skirts and well fitting bodices. Satin moulds to the figure, and has a sheen which emphasizes every movement, and should therefore only be worn by the slim or average figure. Some materials are specially treated to resist creasing; and a comparatively new material, known as nylon, has special qualities such as durability, strength, resistance to moth and mildew, and shaping qualities, under heat and moisture, formerly found only in woollen materials. On the other hand, nylon has a poor affinity for some present-day dyes. The present (1949) skirts for day wear have lengthened from the knee length of 1946 to midway between the knee and ankle, but in Paris the tendency is for shorter skirts, i.e. 16 in. from the ground. Ballerina, i.e. ankle length, or full length, skirts are usual for evening wear; and trains are sometimes worn at weddings or state occasions.

Apart from good work and careful planning over details, which is always essential in good D., success depends upon 'style', and good style is the art of catching and adapting the prevailing fashion to suit individual figures, to bring out all the best lines and cover any deformities or discrepancies in the figure without sacrificing the smartness of the garment. Accessories, too, are of the utmost importance. These must be suitable to the dress, for it is the ensemble that counts.

The general procedure in D. is practically the same whatever the prevailing

fashion may be. The type of dress, i.e. the occasion for which it is required, having been decided upon, suitable material should be selected, and the wearer's build, i.e., whether tall or short, slim or stout; age and colouring; must be carefully considered in relation to this. The rather short or stout figure should avoid big designs, horizontal stripes, yokes, several tiers, and fulls; whereas the tall slim woman can wear these styles which tend to detract from her height. When choosing material for evening wear, it should be seen under an artificial light. The width of materials vary, cotton and rayon fabrics being from 27 to 36 in., and woollen materials from 42 to 54 in. Children's dresses are usually made of washable light weight non-shrink material, with a mixture of wool and cotton or rayon, and this is 27 or 36 in. wide. Silks and velvets vary in width from 27 to 36 in. The amount of material required depends upon the style of the dress, and the cutter's ability to plan the pattern to the best possible advantage on the material. Day frocks take from 3 to 4 yds of 39 in. material, and formal afternoon and evening dresses can take from 5 yds. to anything up to 9 yds of material, dependent upon the fullness and style of the skirt, and the length.

The making of bodices and skirts is generally in the hands of two quite separate bodies of workers in large establishments. The pattern is first drafted according to an accepted set of rules in D., and particular care must be taken to ensure accurate balance as well as the correct measurements. Fit and style depend largely upon correct balancing, which varies with the carriage of the figure, the set of the shoulders, and the curve of the waist line, largely dependent upon the manner of life of the wearer and the style of corsets worn. Thus even if the measurements are taken accurately, if the dress is made for a well-set-up woman whereas the destined wearer is very round-shouldered, the result will be that the bodice is dragged at the back and the skirt considerably shorter behind than in front. For a well proportioned figure only one half of the pattern is required, as the two sides of the garment can be cut alike. In the case of one shoulder being higher than the other, or any one-sided deformity, it is wisest to cut the two sides separately. When the pattern is partially tacked together it should be tried on the client and the necessary alterations made. Throughout D., both in the cutting of the pattern and of the material, it is imperative that an ample margin be left, any superfluous turnings being cut off when the garment nears completion. The cutting of the primary pattern to fit the client is frequently omitted if the skill of the dressmaker is sufficient to cut the lining accurately at once. But when a primary pattern has been accurately fitted on the client, it should next be placed upon the lining, which has been previously doubled and laid on a flat surface. Care must be taken that the middle of the length of each piece is on the

straight-length thread of the material so that all the seams may fall slightly on the bias. The outline is then marked through, being either pierced with a stiletto or by a special piercing wheel, as well as indications of the special style, yoke, vest, or any ornament. When the lining has been cut from the pattern, the material itself is cut in a similar way from the lining with allowance for draping or folds. Where the style of the garment involves tucking, the tucks should be made before the material is cut. Each piece of material being laid quite flat over its separate piece of lining, the two are then tacked together and the double material, lining and stuff, tacked to the similar pieces which form the other side. When the back and fronts are attached at the back and under the arms the bodice should be tried on and any necessary alterations made, it being generally possible to effect such alterations at the shoulder side seams by putting the tacking stitches a little forward or back as may be required. Honing the bodice is rarely practised, but where bones are required they should be inserted at this stage. During the process of trying on, indications of necessary alterations are generally made on one side only, and by means of pins or coloured cottons, to save the client the fatigue of standing. The garment is then taken back to the work-room and similar alterations made on the other side. The seams are then closed, machined, and neatened, either by being scalloped out, or by oversewing, or by a binding of thin silk. The sleeves, which are cut and made up separately, are fitted on to the client at the same time as the bodice, and should now be fitted into the arm-holes, and if there is fullness it should be carefully arranged to give ease to the movements of the arms.

The quality of the work and the style of the garment depend upon the class of dressmaker and upon the price paid. Most firms have stock-sized dress models to fit the garments upon, and many clients have their dress stands made exactly to their own shape and measurements, and so avoid the fatigue of trying on the garment until it is completed. Nowadays, however, most dress trade consists of wholesale houses. Owing to the high cost of labour, the individual tailor and small dressmaker are disappearing. Even wealthy women buy ready-made clothes, designed by experts, which are made in a wide range of sizes, and can, with slight alterations, be made to fit almost any figure. Fashions change as often as the seasons, but during the Second World War there was little variation from the tailor-made costume and shirt blouse, and women's clothes became practically as uniform as men's. The skirt of a half century ago was cut in 'gores,' tight round the hips and flowing out at the feet; that gave place to the full skirt gauged at the waist, which in time was ousted by the 'directoire,' 'tub,' and 'hobble' styles. These were followed by the skirt cut in four pieces, a front piece, two side pieces and a 'panel' back, to

give the appearance of straight lines, which in turn gave place to the fashion in which, generally, the straight lines were maintained and a freedom of movement given by pleats in the front of the skirts. In 1917 the 'New Look' was designed, with nipped-in waist, small rounded shoulders (a change from the pronounced square or broad shoulders of the last 10 years) and full long skirts. Later designs were a modified form of the 'New Look' with simpler and more definite lines; but in the extravagant styles the lines became more exaggerated and there is a revival of the high-waisted kintyre style. Straight pencil skirts with back interest are being designed to be worn with jackets, and also feature in the extravagant models. Capes are in vogue again: deep and decorated pockets; maggyr sleeves; and deep collars and cuffs. Bodices or blouses are fairly close fitting and without trimmings and with or without collars. The front pieces of a skirt are slightly 'gored,' i.e. narrowed from the bottom up to the top on both sides, with the centre falling straight with the selvedge threads, though some skirts nowadays have the centre front on the bias and the sides cut on the straight of the material. The side pieces are cut narrow and slightly gored at the bottom; they fall better if one side is cut on the straight or selvedge edge, and one on the cross, the straight side of each being nearest the front. The back piece is cut very similarly to the front, and is joined on to the side pieces to give a panel effect. An average walking skirt measures about 2 yds. round the bottom, whereas the lower edge of an evening skirt is from 4 to 8 yds. The measure required for the length of the skirt will be different for the front; for the sides, where allowance must be made for the curve of the hips; and for the back. It is best to take the measurements for each separately. Skirts are generally mounted on a belt of the same material, or on a petersham band; and a placket hole provided by making an opening of about 10 in., usually by leaving the left-hand seam open, and closing it with press fasteners, hooks, or a zip fastener. The more elaborate draped skirts are generally made to be joined in one garment with the bodice, and so come under the heading of gown or robe. Habit skirts are usually only made by tailors, as are most sports skirts, which are made shorter and fuller than the ordinary skirt for walking.

In big firms the usual term of apprenticeship for learners is two years, after which the learner serves for some months as an 'improver' before she is rated as a regular hand. Where the 'branch' system is in force, the learners serve in groups as fitters and cutters, as bodice hands and skirt hands, and have thoroughly to master their particular branch. Private dressmakers generally keep assistants to do the stitching and finishing, but do the cutting and fitting themselves, handing the cut and fitted lining and material on to one of the hands with the design and, perhaps, a few words of instruction, after which she is supposed to be able to com-

plete it. In a humbler class of the trade the dressmaker only keeps one or two apprentices, and does all except the actual stitching and finishing herself. Sometimes the dressmaker provides the material and all the necessary items, and charges for the completed garment, but many clients like to provide their own materials and have them made up at a fixed charge. Besides regular dressmakers, there are a number of visiting workers, who come to their clients' houses and either make or renovate at a charge of so much for the day, irrespective of the amount of work done.

Women the world over still look to Paris for their inspiration in all matters of dress, although the importance of London is slowly but surely gaining a hold upon other countries. Vienna also ranks very high in the scale of fashion. Numerous periodicals are pub. which give the latest modes from the world's fashion centres, and for many years it has been the custom of the home dressmaker to copy and adapt these models for her own use. A great drawback in home-D. is that, unless she is prepared to take a thorough course of instruction in the art, the amateur needlewoman will find that there is practically always a lack of finish in her own productions which betrays their origin. For the women with leisure or inclination to take a course in D., or for those who are adopting it as a career, every facility is now offered in the numerous Domestic Science schools throughout the kingdom, in the polytechnics and technical schools of London and the provinces; in women's institutes, and other educational centres. The 'professional touch' can be acquired only when all the details of a dress are properly finished. The novice must learn first how to make her own patterns, how to choose and cut out the material to the best advantage from her patterns, and finally how to make up the material into a fashionable and well-fitting garment. Various stitches must be mastered, from the preliminary tailor's or ordinary tacking to the finished embroidery stitches. Seams, hems, and bindings are all given a variety of treatment, according to their sphere of utility: the making of button-holes, pleats, tucks, cording-, pipings, and facings, are all essential subjects in dress-making. The neat fitting of a collar, the insertion of sleeves, and even the right method of dealing with pockets are all part of the dressmaker's lore, requiring skill and care. The home-dressmaker needs to have the following tools to hand before commencing work: pins, needles, tacking and sewing thread, tape measure, set-square, tracing wheel, tailor's chalk, shears for cutting out, scissors; and an iron and board for pressing seams as the work proceeds. A dressmaker's stand is a useful asset; and a sewing machine is indispensable to the dressmaker. If the modelling method is used, then some soft cheap fabric for draping is necessary. If working from a Trade or bought Paper Pattern it should be pinned up and held against the wearer, and any adjustments made before laying out on the material,

and the directions given on the chart should be followed.

Fashions change so swiftly in modern times that works on all but the fundamental principles of dressmaking soon become out of date. A few books, however, which would be helpful to the student of D. are: Agnes M. Miall, *Home Dressmaking*, 1933, and *Making Clothes for Children*, 1946; Anna L. Hird, *Principles and Practice of Needlework and Dressmaking*, 1934, 1944; Gertrude Mason, *Pattern Making Book*, 1935; Margaretta Byers, *Designing*, 1939; R. K. Evans, *Dress: The Evolution of Cut and its Effect on Modern Design*, 1939; W. H. Hulme, *Women's and Children's Garment Design*, 1948; E. Lucy Towers, *Standard Processes in Dressmaking*, 1948.

Prevailing fashions can be noted in the current issues of numerous periodicals for women, such as *Vogue*, *Screen Fashions*, *Fashion Review*, and *Shopping*, etc. See also EMBROIDERY, FASHION, NEEDLEWORK, TAILORING.

Dreux, once the chief city of the Gallic tribe, the Durocasses, now the cap. of an arron. in the dept. of Eure-et-Loire, N.W. France, on the Blaise, 27 m. N.N.W. of Chartres by rail. Though it possesses the ruins of a medieval castle, once owned by the counts of D., its chief pride is the exquisite chapel built in 1816 within the castle precincts by the mother of Louis-Philippe, containing fine stained glass and sculptured tombs belonging to the Orleans family. Its sixteenth century Gothic hôtel de ville and a magnificent church of St. Peter with a twelfth century choir and fifteenth century nave are noteworthy sights of D. Pop. 12,200.

Drevet, Pierre Joubert (1664-1739), Fr. engraver, studied under Germain Audran at Lyons, and then under Gerard Audran at Paris. In 1696 he became engraver to the king, and an Academician (1707). His best portraits include those of Louis XIV., Cardinal Fleury, the Dauphin, Robert de Gotte, and Boileau.

Drevet, Pierre Joubert (1697-1739), son and pupil of above, surpassing his father. He was admitted to the Academy 1729. His portrait of Bossuet after Rigaud (1723) is considered his masterpiece. Other works are portraits of Lecouvreur, Bernard, Cardinal Dubois, and Pucelle. 'La présentation au temple' is the best of his historical subjects. His engravings are mostly after Coppel, Boullongne, Restout, and Rigaud. See A. Firmin Didot, *Les Drevet*, 1876.

Drew, Samuel (1765-1833), Eng. writer, known as the 'Cornish metaphysician.' After a wild youth he joined the Wesleyan Methodists (c. 1785), and became a local preacher. He early won fame by his *Remarks on Paine's 'Age of Reason'* (1799) followed by *Essay on the Immateriality and Immortality of the Soul* (1802); autobiographical sketch prefixed to *Essay on the Identity . . . of the Body* (1809) and he ed. the *Imperial Magazine* from 1819. See life by his son, 1834.

Dreyfus Affair, The, result of the anti-Semitic feeling in France, of which the real culprits in this case (Henry and Ester-

hazy) availed themselves in order to hide their own delinquencies. Capt. Alfred D. was the son of a rich Jewish manufacturer in Paris. He entered the army, became an artillery captain, and was attached to the general staff. In 1894 he was arrested accused of delivering documents to the Ger. Gov. He was tried by court-martial sitting in secret, was found guilty and condemned. He was degraded and transported to Cayenne, Ile du Diable. His condemnation roused throughout the whole of France a great wave of anti-Semitism, and the majority of the Fr. nation were prepared to believe anything evil of the Jews. But his conviction had only strengthened in the minds of his relatives the fact that he was innocent, and the military party in France, by their mere attempts to estab. the truth of the conviction, convicted themselves of conspiracy. The publication of the *bordereau* which D. was supposed to have sent to the attaché of another Power proved to his friends that it was a forgery. But still they held back; they desired full proof before they proceeded further. Colonel Picquart convinced himself that the sentence was unjust, and was sent to the hinterland of Tunis. In 1897 Capt. Esterhazy was accused of being the real author by Capt. D.'s brother. Esterhazy was tried by court-martial and acquitted. The next person to take up cudgels on behalf of D. was Emile Zola. To Zola as to all the Dreyfusards it had become apparent that the military staff would not allow justice to be done. Zola in an open letter to the president announced this fact in plain hard language. He was tried for libel, convicted, and fled the country. But his conviction was tantamount to a victory. Zola had achieved his object. As he said, with clear foresight: 'Truth is on the march and nothing can stop it.' In 1898 the case was taken up by Clemenceau, and one of the documents was found to have been forged. Henry, the chief of the intelligence dept., was placed under arrest, and immediately afterwards cut his throat, having confessed that he had fabricated the document. The struggle was now against the army, and for a short time the republic itself was in danger. M. Brisson's cabinet, however, transferred the case to the Court of Cassation, and another court-martial was held at Rennes, where D. was again convicted, but obviously his conviction was merely the last struggle of the military party, since extenuating circumstances were admitted and the sentence reduced. This was followed almost immediately by a free pardon. The only common-sense conclusion which could be reached was that Esterhazy and Henry were the real culprits, and that the army was too obstinate to admit an obvious fact. The proceedings against D. were finally quashed in 1906, and he was again restored to the army, being given the rank of major. Zola's feelings at the moment of his intervention are now known to us through the document, unpub. till 1948, *Impressions d'audience*, in the possession of Dr. Jacques Emile Zola, his son. The fresh element that is pro-

vided by these *Impressions* is Zola's realisation of the need for France of the symbol of Dreyfus in order that she might continue to believe in military glory. Zola, in fact, opposed to the vision of a 'warlike France' that of another France which, 'having become liberty, tries also to be justice.' See E. Zola, *Vérité*, 1903; J. Reinach, *Histoire de l'affaire Dreyfus*, 1901-11; A. Dreyfus, *Souvenirs et correspondance publiés par son fils*, 1936; L. M. Friedman, *Zola and the Dreyfus Case*, 1937.

Dreyse, Johann Nikolaus von (1787-1867), Ger. locksmith and inventor; worked in a musket factory in Paris (1809-14), and on his return founded an ironware factory in Sommerda. He manuf. percussion caps under a patent (1824), and invented improved firearms, notably the muzzle-loading needle-gun (1827), and the breech-loading one (1836). Adopted by the Prussian army (1840), its superiority was shown in the war with Austria (1866). The modern repeating rifle has replaced it.

Driffeld, Great, see GREAT DRIFFIELD.

Drift, see under GEOLOGY.

Drift Net, see under FISHERIES.

Drill, Papio (or *Cynocephalus leucophaeus*), is a baboon of the same genus as the mandrill, but it differs from this hideous creature in the absence of bright colours on its muzzle and nose. It is a terocious inhabitant of W. Africa.

Drill, see under BORING.

Drin, wild riv. of Albania, which flows from Lake Okhrida N., and then W. to the Adriatic Sea at Bolana. Length 173 m.

Drina, (1) riv. of Yugoslavia, 288 m. long, which rises in Montenegro and joins the Save W. of Belgrade. (2) prov. of the Yugoslav republic of Montenegro.

Drinker Respirator, see IRON LUNG.

Drinkwater, John (1882-1937), Eng. poet and dramatist, educated at Oxford High School and Birmingham Univ. Was for twelve years a clerk in an insurance office. Assisted in founding the Pilgrim Players, which later became the Birmingham Repertory Theatre under Sir Barry Jackson. His first poems were *Men and Hours*, pub. in 1911, and his first play, a one-act play in verse, in 1911. Then followed topical plays on war, *Rebellion*, in verse (1914), and *Swords and Ploughshares* (1914). But his greatest success was *Abraham Lincoln*, a play produced in 1919. His *Oliver Cromwell* followed in 1921, but did not attract such attention as the earlier play. This was followed by the plays, *Mary Stuart* (1922), *Robert E. Lee* (1923), the prose works, *The Pilgrims of Eternity*, on Byron (1925) a dramatic version of Thomas Hardy's *Mayor of Casterbridge* (1926), *The King's Reign* (1935), and the *Midsummer Eve* (1935). Autobiographical works: *All About Me* (1928), *More About Me* (1928), *Inheritance* (1931), and *Discovery* (1932). He also wrote a number of essays, including a striking study of his friend, Rupert Brooke (q.v.).

Driver, Samuel Reiles (1840-1914), Eng. divine and Hebrew scholar. After a brilliant career at Oxford, he became

Regius prof. of Hebrew, and canon of Christ Church, 1883. His pubs. include *An Introduction to the Literature of the Old Testament* (1891); commentaries and notes on *Leviticus* (1894), *Deuteronomy* (1895), *Daniel* (1900), *Genesis* (1904); *Modern Research as Illustrating the Bible* (1909), *A Hebrew and English Lexicon of the Old Testament* (with F. Brown and C. A. Briggs) (1906). D. was a member of the O.T. revision committee, 1876-84.

Driving (of animals). Many animals are used for traction in various parts of the globe, but the most common are the horse, the mule, the ass, and the ox; in very cold climates the reindeer and the dog are also utilised. Ever since man possessed domesticated animals he has made use of them in this manner; an element of sport has also been associated with D. from very early times. Thus the Romans were very fond of chariot races, as also were the Gks. The custom of D. for pleasure, without racing, is of modern development; such a pleasure would have been impossible before Macadam and Telford made such a revolution in the art of road-making. Spring carriages and level roads were a necessary corollary, but when these existed there sprang up a great number of D. clubs in Britain, of which the Bensington Driving Club, founded in 1807, was the pioneer. The most usual method of D. is with one horse; when two horses are driven, they are either abreast (the customary way) or in tandem; four horses are driven in two pairs, the foremost pair being the 'leaders,' the other the 'wheelers.' Practice is essential before a good driver can be made, but the quality known as 'good hands' is to a large extent innate and instinctive. The reins are held in the left hand between the thumb and forefinger and second and third fingers. The left hand should be held on a level with the bottom of the driver's waistcoat, at a little distance from the body. The upper arm should hang freely against the side, the forearm should make a right angle with the elbow joint, and be held horizontally across the front of the body. The wrist should be slightly bent inwards with the back of the hand facing the horses. When the reins are thus held an experienced driver will 'feel' the horse's mouth without irritating or checking it. The D. of a tandem or a four-in-hand is a more difficult matter, as two pairs of reins have to be manipulated. The reins are held in the following manner: those of the leaders are separated by the forefinger; those of the wheelers by the middle finger. Thus between the forefinger and middle finger are the reins of the off leader and the near wheeler. The reins are first of all gathered together in the right hand, in the same position as they will be in the left, before the driver mounts to his seat. In starting a four-in-hand it is essential that the leaders and wheelers should start simultaneously, and when started, the driver should, by adjusting their length with his right hand, ensure that he has each horse under perfect control. When rounding corners a 'loop' of one or two inches of the leaders'

reins is taken up by the right hand and placed under the left thumb. It is also necessary that a driver who has any pretensions to skill should be able to handle his whip to perfection. He should be able to strike with the thong, lightly or vigorously, any horse he wishes. When the leaders need the whip the wheelers should not be disturbed; a first-class driver can 'touch up' the off leader under the swinging-bars (under which the thong should always pass) without agitating the wheelers at all. In tandem D. skill with the whip is even more necessary, as a well-directed cut with the whip will check the leader as a rule if he should try to turn right round. Four-in-hand D. is not so difficult as tandem, as although there is more weight on the hands, there is much more control over the leader.

Drocourt—**Quéant Switch**, in the 1914-1918 war a key position of the famous Hindenburg Line. It was the Brit. objective in the battle of Arras of April 1917, but was not taken. In Sept. 1918, after extremely bitter fighting, the 'switch,' as the position was called, was taken by storm by the troops of General (later Lord) Horne, together with many tns. and vils.

Droeshout, Marten (Martin) (fl. 1620-1651), engraver of the seventeenth century, probably of Dutch extraction. He settled in England, working chiefly for booksellers and engraving portraits. His most famous production is the engraved portrait of Shakespeare, prefixed to the first folio ed. (1623) of his plays. This was probably copied from the original painting made by D.'s uncle, which was discovered in 1892, and placed in the Shakespeare Memorial Gallery at Stratford-on-Avon. Other portraits were of Villiers, duke of Buckingham, the marquis of Hamilton, Dr. Donne, John Fox, and Sir Thomas Overbury.

Drogheda (anc. **Droichead Atha**, the bridge of the ford); seaport, mkt. tn. and municipal bor. (till 1885, a parl. bor.) on either bank of the Boyne, 4 m. from its mouth in the Irish Sea, on the Great N. main line, 31½ m. from Dublin, in the coe. of Meath and Louth, Eire. The depth of water alongside the N. quay is 21 ft. at highest and 14 ft. at lowest tide. Considerable agric. produce is shipped to Liverpool and Glasgow, and the salmon fishery in the Boyne has its centre here. Recently the former flourishing linen and damask industries have been revived, and there are manufs. of various articles including soap, leather, beer, and flour. The St. Lawrence Gateway still remains of the anc. walls, and there are relics of the Augustinian abbey (1206) and the Dominican monastery (1221). When Cromwell captured the tn. in 1649, most of the garrison were butchered. In 1690, after the famous battle of the Boyne, D. surrendered to William III. Pop. (1939) 12,000.

Drohobycz, former tn. of Poland, cap. of the D. Region of the Ukrainian S.S.R., E. Galicia, and centre of a petroleum producing dist. The Austrians defeated the Russians here in 1915. Pop. 30,000.

Droit Administratif. That system of law which in France gives an over-riding authority to the state tribunals over the ordinary law. It exists also in other European states, but is not so marked a feature as in France. There is no precise equivalent in our language: but it is defined in general terms by the Fr. authorities as 'the body of rules which regulate the relations of the Administration or of the Administrative authority towards private citizens.' D.A. is in fact that portion of Fr. law which determines: the position and liabilities of all state officials; the civil rights and liabilities of private individuals in their dealings with officials as the representatives of the state; and the procedure by which those rights and liabilities are enforced. The modern D. A. of France has grown up and assumed its existing form during the nineteenth century, being the outcome of more than a century of revolutionary and constitutional conflict. The essential characteristics of D. A. are: the rights of the state are determined by special rules, i.e. as opposed to the ordinary law; the ordinary law courts have no jurisdiction in matters concerning the state, and administrative litigation is thus determined by the Administrative Courts; the coexistence of judicial courts and administrative courts results in a conflict of jurisdiction in which the latter courts prevail; and state officials are protected against the ordinary law. See A. V. Dicey, *Law of the Constitution*, 1885; G. Jéze, *Les Principes généraux de droit administratif*, 1904; Seissier, *La Responsabilité de la puissance publique*, 1906.

Droits of Admiralty, see ADMIRALTY, **DROITS OF**.

Droitwich, mkt. tn. and municipal bor., on a canal connected with the Severn, and also on branch lines of two railways, 6 m. N.N.E. of Worcester, in Worcestershire, England. It is famous for its brine springs or 'wyes,' which are mentioned in the Domesday Book. Pop. 4500.

Drôme, dept. in the S.E. of France, bounded on the N. and N.E. by Isère, on the E. by Hautes-Alpes, on the S.E. by Basses-Alpes, and the S. by Vaucluse, and on the W. by the Rhône. Its total area is 2533 sq. m. Between the Rhône and Isère lies the fertile and hilly dist. known as the Viennois, and including the region of the Valloire, called the 'golden valley.' The natural div. through which flow the upper courses of the D., Roubion, Jabron, etc., is quite mountainous, the highest peak having an altitude of 7890 ft. The main crops are wheat, potatoes, and oats. Fruit, including olives, figs, and walnuts, wine, cheese, live stock, and silk obtained from silkworms fed on native mulberries, are the staple exports, whilst the prin. import is coal. Native minerals supply many potteries and porcelain manufs. Besides Valence, the cap., the chief cities are Die and Nyons, which all give their names to arrons., and Montélimar, Crest and Romans. Pop. 287,700.

Dromedary, or *Camelus dromedarius*, species of camel which is distinguished by its solitary hump, *C. bactrianus* having

two. It is a large ruminant which occurs in Arabia and is never found wild; the hump is adipose (fatty), and the body is covered with hair. See also CAMEL.



DROMEDARY

Dromia, genus of crabs in the family Dromiidae. Its well-defined orbits into which the eyes can be retracted, the fourth and fifth pairs of trunk-legs are small and are held dorsally, and the carapace is shaggy. *D. vulgaris* is found on Brit. and Mediterranean shores.

Dromore, par. and tn. of N.W. co. Down, N. Ireland, on R. Lagan, 15 m. from Belfast. The present cathedral was erected after the destruction of the tn. in the insurrection of 1611, and has the tombs of Jeremy Taylor (1613-67) and other bishops. Linen is manuf. Pop. 2400.

Drone, see BEE.

Dronfield, par. and tn. of England in the co. of Derbyshire, 6 m. from Chesterfield, and 6 m. S. of Sheffield. It is situated on the R. Drone, in the midst of collieries. Iron and steel goods are manuf. Pop. 4500.

Dronte, obsolete name, of Dutch and Fr. origin, for the dodo (*q.v.*).

Drontheim, see THRONDIJEM.

Drop-forging, or die-forging, a process which has replaced the old drop-hammer used in swaging, die-work, striking up sheet metal, etc. Many of the operations performed at the smith's anvil can be more quickly and better done by such a machine as the die-forge. A white-hot mass of metal is placed in the die, and the blows of the hammer force it into the same shape as the die; the metal goes into the die as a shapeless mass, so that when hammered some of it is squeezed out of the side of the die and, if this is not checked, would prevent the die from closing, and so spoil the stamping. To obviate this possibility, the metal is placed on a die of the same shape as the object, but pierced right through; when hit by the hammer the forging is forced through the die, thus leaving the stripped fin or metal behind, and the forging is then proceeded with.

In the manuf. of automobiles, aircraft, and other machines having many small parts the forgings are stamped so accurately that very little metal is wasted by machining in the shops, thereby saving both time and money. See H. Hayes, *Drop Forging and Drop Stamping*, 1923; S. Johnson and J. Warby, *Drop Forging Practice*, 1937.

Dropsy, shortened form of *hydropsy*, an accumulation of serous fluid in the tissues or cavities of the body. Serum is the colourless liquid constituent of blood, and under normal conditions is exuded through the walls of the blood capillaries in order to build up the tissues; a part of the exuded fluid is returned to the blood-stream by the veins and some by the lymphatics. When from any cause serum is exuded in abnormal quantity or is not absorbed to a sufficient extent, collections of fluid are apt to form. D. is therefore not a disease itself so much as a symptom of disease. Half of the cases of general D. are due to heart disease, and many are due to kidney disorders. Other causes may be weakening of the walls of the capillaries, by which exudation is increased, or, in the case of local D., any obstruction of a vein which causes increased blood pressure. (*Edema* is D. of superficial tissues, limited in area; *Anasarca* is the term applied to generalised D. of the subcutaneous tissues. *Ascites* is an accumulation of serum in the abdominal cavity, generally due to diseases of the liver and spleen. *Hydrocephalus*, or water on the brain, is an accumulation in the brain-cavities. *Hydrothorax* is a D. in the pleural cavities, characterised by a large proportion of albumen in the fluid. *Hydropneumothorax* is an accumulation in the membranous sac enclosing the heart. The treatment of D. involves the employment of purgatives, diaphoretics (which assist perspiration) and diuretics, in order to promote increased excretion. In severe cases tapping is resorted to, when a small drainage tube may be inserted to draw off the fluid.

Dropwort, common name for the plant *Spiraea* (or *Ulmaria*) *Filipendula* of the order Rosaceae, occurring in dry pastures in Britain. Has small white flowers resembling those of meadow-sweet. Water-dropwort is the common name for a poisonous species of plant of the genus (*Enanthe* of the Umbelliferae order).

Drosera, plant of the Sundew family (*Droseraceae*) which comprises nearly 100 beautiful insectivorous plants, growing in boggy places in all parts of the world. The leaves are covered with glandular hairs, whereby insects are trapped and digested. In Britain there are three species, *D. longifolia*, a common bog-plant; *D. anglica*, found chiefly in Ireland; and *D. rotundifolia*, the common or round-leaved sundew. The latter is an acrid and caustic plant used in Italy in making the liquor called *Rosoli*. See INSECTIVOROUS PLANTS.

Droste-Hülshoff, Annette Elizabeth, (Baroness) von (1797-1848), Ger. poetess, b. near Münster, Westphalia, a writer chiefly of lyric and narrative verse and

considered one of the greatest nature poets who have lived. Her book of nature poems *Heidebilder* was pub. in 1844, and in 1852 a cycle of religious poems under the title of *Das geistliche Jahr, nebst einem Anhang religiöser Gedichte. Letzte Gaben*, pub. by L. Schucking in 1860 included her short story 'Die Judenbuche.' Her collected poems were pub. by Schucking (1878-79) and a critical ed. by K. Schulte Hemminghausen (1925-1930). See lives by Schucking, 1862; K. Busse, 1903; C. Heselhaus, 1943; Zottman, *Deutschlands grösste Dichterin*, 1896; and letters ed. by H. Cardauns, 1909.

Drouais, family of Fr. artists, the third being the most famous:

Hubert (1699-1767) was intimate with Nattier, Van Loo, and Oudry. His portraits include those of the painter Christophe, and of the sculptor Robert le Lorrain.

François Hubert (1727-75), son of above, painted children's portraits, and did much work in Louis XV.'s reign. Examples are portraits of Mme. de Pompadour, Mme. du Barry, Mme. Clotilde, Marie Antoinette. His 'Child playing with a Cat' (1768) is characteristic.

Jean Germain (1763-88), son of above, pupil of David and Bénédict. He won the Academy prize (1874) with 'Christ et la Cananéenne.' While in Rome he painted 'Marius à Minturnes,' 'Philoctetes . . .', and 'A Wounded Gladiator.' See Chausard, *Notice sur Drouais*.

Drouet, Jean Baptiste, Comte D'Erlon (1765-1844). Marshal of France, b. at Reims. Won fame in the wars of the Republic and the Empire. When Napoleon escaped from Elba, he seized and held the citadel of Lille for the Emperor. Commanded the first *Corps d'armée* at Waterloo. Left France at the restoration, but returned after the July Revolution; subsequently becoming marshal and governor of Algiers.

Drought, or **Drouth** (A.-S. *drugað*, from *drugian*, to dry), dryness, want of rain or water. The term is especially applied to such lack of rain and moisture as affects the earth and its fertility, preventing the growth of plants. 'Periods of more than fourteen consecutive days without measurable rain' were fixed by Symons (1838-1900) as the exact time that must elapse without rain to cause an 'absolute drought.' See Symons' *British Rainfall* pub. annually since about 1863, and his *Meteorological Magazine*. From about 1714 to 1750 severe Ds. in England brought calamitous results with famine threatened and a series of devastating epidemics. There is reason to believe that even more acute Ds. occurred in the Middle Ages, when at least twice the R. Thames could be crossed dryshod: there is said to have been no harvest in 1177. The cholera year of 1854 was very dry, and hardship, famine, and disease are often caused by D. In the 19th century England has had two major Ds., in 1821 and 1833-34; and a Russian position was reached also in 1947 although rainfall until the end of

July was heavier than normal, the following three months were dry and events suggested that improvement in the methods of conserving water are necessary. The Sahara and Kalahari deserts of Africa, the Gobi desert of Central Asia, Great Salt Lake district in N. America, and certain regions of India and China suffer from D. nearly all the year round. The regions which suffer from almost continual D. are often shut off by high mountain ranges from the influence of winds carrying moisture. The causes of D. are not yet fully understood, but impressive evidence has been produced pointing to an indirect association between periodic changes in the output of solar radiation (phases of the sunspot cycle) and the caprices of rainfall in the U.S.A. See C. E. P. Brooks and J. Glasspoole, *British Floods and Droughts*, 1928; I. R. Tannehill, *Drought: its Causes and Effects*, 1948.

Drowning. The cause of death by D. is asphyxiation, and the entrance of water into the lungs. After death the skin of a drowned person presents the appearance known as 'goose skin,' or *cutis anserina*, the face is exceedingly pale, a frothy liquid is found in the lungs and air passages, and water in the stomach; froth is also present at the mouth and nose. Complete insensibility supervenes in from one to two minutes, and death in about five minutes, though persons have been known to recover who have been immersed for a considerable length of time. The D. person rises to the surface by his own efforts a variable number of times, not necessarily the three of the popular fallacy. Dr. W. Hawes was instrumental in founding the Royal Humane Society (q.v.), which has been the means of rendering the principles of life-saving widely known. There are four methods which are in use for the restoration of persons apparently drowned. The method of Marshall Hall (the earliest, dating from 1856), and those associated with the names of Schäfer and Sylvester, are described under **ARTIFICIAL RESPIRATION**. In Howard's method the body is first of all placed face downwards with a roll under the stomach, and water and froth are expelled by pressure on the back and lower ribs. After being pulled over the roll, the patient is turned over, and the arms placed above the body with the hands near the head. The tongue is secured by a cloth or by forceps. The operator kneels over the body, places both hands on the lower part of the patient's chest, with the thumbs just under the lowest ribs. The operator then presses forward steadily, raising the ribs and bending himself forward, after which he throws himself slightly backward, repeating this about fifteen times a min. This method is easier than the Sylvester, and can be practised when the patient's arms are hurt; care must be taken that undue pressure is not exercised. In all these methods the operator should continue for as long as there is any hope, for an hr. or more if necessary. When the patient is coming round, teaspoonfuls of hot

water, brandy, etc., should be administered, and hot-water bottles applied. In olden times D. was a cap. punishment; it was abolished in England about 1620, in Scotland in 1685, in Switzerland 1652, in Austria 1776, and in Ireland 1777. For methods of rescuing persons who are D., see LIFE SAVING.

Droylsden, par. and tn. of Lancashire, England, 4 m. from Manchester. The manufs. of cottons and chemicals are important, and it has print-fields and dye-works. Pop. 14,000.

Droz, Antoine Gustav (1832-1895), Fr. novelist, b. in Paris, grandson of Jean Pierre D. (1746-1833) a medal engraver. Author of sev. popular and brilliant novels: *Monsieur, Madame et Bébé* (1866) *Entre nous* (1867) and *Le Cahier bleu de Mlle. Cibot* (1869), *Les Étiages* (1875) and *Tristesses et sourires* (1884).

Drug, any simple medicinal organic or inorganic substance, used as an ingredient of a mixture or by itself. In a more restricted sense, applied to narcotics such as opium or hashish. The narcotic control conventions are administered by an international authority, the Permanent Central Opium Board. Anxieties recently expressed by the Board serve to emphasise the apparent success of Brit. measures for controlling the use of dangerous Ds. Measures controlling the consumption in Britain of a range of dangerous Ds. were strengthened by regulations which came into force on Jan. 1, 1949. The regulations restrict the authority to dispense dangerous Ds., and impose on pharmacists the responsibility for satisfying themselves of the genuineness of all prescriptions which they dispense for a dangerous D. D. addiction does not present a serious problem in the United Kingdom, addicts numbering fewer than 400. The prin. Ds. of addiction are morphine and heroin. Few use cocaine and the number who do so is decreasing. The domestic manuf. of dangerous Ds. is controlled by a system of licensing, and supervision is exercised by Home Office inspectors over persons authorised to possess and use dangerous Ds.

Drugget (Fr. *droguet*), common felt or coarse woollen fabric, often printed on one surface. The heavier kinds are chiefly used for covering carpets (hence called 'crumb-cloths'), as a substitute for carpets, or as a lining or border. The lighter kind is used for table-covers. A strong dress-fabric of this name was formerly used largely for petticoats and workmen's aprons.

Druids, caste of priests among the Celtic inhabitants of anc. Gaul and Britain, about whom a considerable body of tradition has survived, no doubt largely modified and coloured by legend, especially in the case of the Irish D. Etymologists differ as to the derivation of the name itself; the long accepted connection with the Gk. *δρῦς*, oak, is now doubted. The Welsh and Breton *derwydd* and *drauid* are not original forms. The Latin form *druida* points to a Gaulish *druids*, Irish *draí*, which has been analysed into *draí*, very learned, knowing. Caesar gives

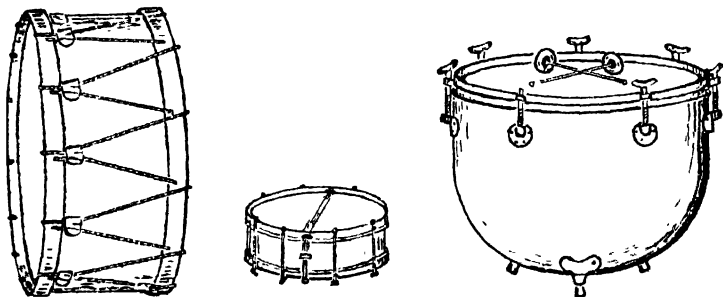
the first circumstantial account of the D.; he tells us that all nobles and men of dignity in Gaul were among the D.; that they were the law-givers and priests; that the caste was not hereditary; the chief D. was elected; they had the power of inflicting heavy punishment for disobedience to their decrees. They had a written language, believed in the immortality of the soul, and were learned in astrology and the natural sciences. It appears that Caesar may have overestimated their powers. Britain was the headquarters of the D., and but a yearly meeting was held in Gaul; the Gaulish novices came for training to Britain. Human sacrifices seem generally to be attributed to them, and they studied divination by the flight of birds and by the dying convulsions of their victims. The oak tree was sacred and all its fruits, hence, too, mistletoe; religious ceremonies were performed in oak groves. Pliny writes of them as practisers of medicine and sorcery, and of their cutting the mistletoe, robed in white, with golden sickles, and of the sacrifice of white bulls. Strabo tells of their golden collars and armlets; he describes them as bards and soothsayers. Tacitus gives us an account of their last stand, A.D. 61, on the is. of Mona (Anglesey), when the Brit. D. were exterminated and their sacred groves cut down, and the suppression of the D., which had been the object of Rome since Augustus, was accomplished both in Gaul and at any rate in England and Wales. The later hist. is confined to the Irish D. Anc. Irish literature has many tales concerning them, much overlaid with legend and with the traditions of the early Christian struggle with the supporters of pagan rites. Thus it is that the Irish accounts attribute to them sorcery and witchcraft. They are found with power of changing the weather; the arch-druid appears as a leaping juggler, tossing swords and balls in the air; when a famine occurred, the D. ordered the son of a sinless married couple to be sacrificed and his blood mixed with the soil; a D. by enchantment causes the death of King Cormac; they appear also as bards and poets. The legends of the struggle of the D. against St. Patrick and St. Columba are also interesting. See D'Arbois de Jubainville, *Les Druides et les dieux Celtiques*, 1906; P. W. Joyce, *Social History of Ancient Ireland*, 1903; D. Wright, *Druidism*, 1924; T. D. Kendrick, *The Druids*, 1927.

Drum, musical instrument of percussion. Although it is said to have been introduced into Europe about the time of the Crusades, nevertheless, instruments which strongly resemble it were known during the early days of the Rom. empire. Obviously one of the most primitive of musical instruments, it forms almost exclusively the sole musical instrument of savage peoples. The tom-tom, a form of D. played with the fingers, is the chief music of many primitive tribes, and this instrument is also known to have existed in Egypt considerably more than 1000 years before Christ. There are three

varieties of Ds.: (1) The common or side-D., (2) the bass-D., and (3) the kettle-D. The side-D. is, as its name implies, worn at the side of the player, and is played upon the upper side with two sticks. It is found nowadays almost exclusively as an accompaniment to fife bands. The bass-D. is almost entirely a military instrument, being very similar in construction to the side D., but larger. It is played with two sticks, both sides being used. The bass-D. has within recent years been introduced into large orchestral music by the more modern composers. The only instrument of real musical value, however, is the kettle-D. This instrument is composed of a cauldron-shaped shell or kettle of copper or brass,

100 to 200 ft. high, the longer axis always lying parallel to the former local glacial motion. They occur in America in Massachusetts, round Boston harbour, W. New York, S.E. Wisconsin, and the lake region, and in the parts of Europe and Asia lying N. of the terminal moraine of the Continental glacier. A good example exists between Belfast and Lisburn, Ireland.

Drum-major, since 1878 called the sergeant-drummer, the first or chief drummer in a regimental band, the officer who leads a drum-corps or band, directing its movements, and regulating the pace when on the march. He attends to the bugle calls and teaches the under-drummers. The D. ranks with the sergeants of the



MODERN DRUMS

Military bass drum; narrow shell side drum, shown upside down to expose the snares; and orchestral kettle drum and sticks.

over the mouth of which is drawn tightly a single head of skin attached to an iron ring. By means of screws it is possible to tune this D. within narrow limits. In a full orchestra two are usually found, one with a compass from F. to C, and the other from B \flat to F on the bass staff. The music is invariably written in the key of C. A variety of sticks covered with different materials can be used to produce a harder or softer impact. The kettle-D. is carried by the cavalry, this being the only use made of it in military circles.

Drum of the Ear, see *TYMPANUM* and *EAR*.

Drumcliff, par. of N.E. Sligo co., Ire, on D. Bay, 4 m. from Sligo. It has a carved Celtic cross and a round tower. Pop. 5000.

Drumlog (Gaelic, ridge of stone), moorland tract of Lanarkshire, Scotland, 17 m. from Lanark. An obelisk commemorates the defeat of Claverhouse by the Covenanters, or Cameronians (1679), near London Hill. See Scott's *Old Mortality* for a description of the battle.

Drumlins, or **Drumlings** (from *drum*, ridge), in geology, smoothly-rounded, oval hills of compact, unstratified, glacial drift or boulder-clay, apparently deposited and piled up beneath the Pleistocene ice-sheets. They are usually about $\frac{1}{4}$ m. long,

lieue. His official designation, from 1881, was sergeant-drummer or sergeant-piper (as the case might be), the reversion to the old name being made by the War Office in 1928. The rank is over two centuries old and is to be traced as far back as 1632, in which year it is mentioned by a music writer named Cruso; and seven years later there was a D.-M. on the strength of the Royal Scots and a few years later, on that of the Coldstream Guards.

Drummond, George (1687-1766), public-spirited Scottish officer. He fought against the Pretender at Sheriffmuir (1715). He was lord provost of Edinburgh for the first time in 1725, being chosen six times in all. D. was energetic in resisting the rebels of the '45 outbreak, joining Cope after the surrender of Edinburgh. He helped to found the Edinburgh Royal Infirmary, erected the Royal Exchange, 1753, and laid the foundation-stone of the North Bridge, 1763.

Drummond, Henry (1851-97), Scottish scientist and theologian. He travelled widely, *Tropical Africa* (1888), and *Travel Sketches in our New Protectorate* (1890) being the resulting works. His *Natural Law in the Spiritual World* (1883), and *The Ascent of Man* (1894) were attempts to reconcile evangelical Christianity and evolution: the first book was very

popular, but the second had less success. D. was a man of great personal fascination and wrote in an interesting and suggestive manner, but his reasoning in his scientific works is by no means unassailable.

Drummond, James (1816-77), Scottish historical and genre painter, studied under Allan in the School of Design. His first exhibit in the Scottish Royal Academy was 'Waiting for an Answer,' 1834. He became a R.A. (1852), and curator of the Scottish National Gallery (1868). Among his best works are 'The Vacant Chair' (1837), 'The Porteous Mob,' 'The Covenanters in Greyfriars Churchyard,' 'Peace,' 'War.'

Drummond, James (1835-1918). Eng. Unitarian theologian, educated at Trinity College, Dublin. He became a colleague of Gaskell at Manchester (1859-69), and then professor of theology at Manchester New College, London (1869), succeeding Martineau as principal (1885-1906), and moving with the college to Oxford (1889). His works include *Introduction to the Study of Theology* (1884), *Via Veritas, Vita* (1891), *The Pauline Benediction* (1897), *Life and Letters of Dr. Martineau* (with C. B. Upton, 1902), *Character and Authorship of the Fourth Gospel* (1904), *Paul: his Life and Teaching* (1911).

Drummond, M. James Erie, see PERTH, EARL OF.

Drummond, Thomas (1797-1840), inventor and administrator, entered the Royal Engineers in 1815, but in 1820 accepted Colonel Colby's offer to join him in an ordnance survey of Great Britain. It was in 1825 near Belfast that he first tested the power of his lime-light apparatus (Drummond light), being able to see it at a distance of 67 m., and four years later he adapted it for use in lighthouses. D. also invented an improved 'heliostat,' a mirror especially designed to facilitate the turning of rays of light in a certain direction. Appointed superintendent of the boundary commission in 1831, he became under-secretary for Ireland in 1835, when he discharged his duties so as to win universal respect. See also HELIOGRAPH.

Drummond, William (1585-1649), Scottish poet, b. at Hawthornden, obtained his M.A. degree at Edinburgh Univ., studied law and literature in Bourges and Paris, and spent the greater part of his life at his 'sweet and solitary seat' of Hawthornden, dividing his life between poetry, royalist pamphlets, and melancholy. It was with bitter resentment that he signed the abhorred Covenant in 1639. D. has been called the Scottish Petrarch because of his passionate sonnets (1616) inspired by the early death of his first love, Mary Cunningham, yet he is in no sense a national poet, for his inspiration and much of his sensuousness are drawn from Spenser, and his poems prove him to have been well acquainted with the works of Sidney and many It. poets. *Flowers of Sion* (1623) contains his 'Cypresse Grove,' a musical poem on death, which best preserves the quiet gloom of D.'s mind, and is free from extravagant conceits which sometimes mar his verse. Other of his

works are *Forth Feasting* (1617), and, in prose, *The History of Scotland, from the year 1423 until the year 1542* (1655), known also as *History of Scotland during the Reigns of the Five Jameses*. See D. Masson, *Drummond of Hawthornden*, 1873; A. Joly, *William Drummond de Hawthornden*, 1935. See life by Masson.

Drummond, William Hamilton (1778-1865), Irish poet and Unitarian minister. He wrote poems, *The Battle of Trafalgar* . . . (1806), *The Giant's Causeway* (1811), *The Pleasures of Benevolence* (1835), *Ancient Irish Minstrelsy* (1852); an Eng. metrical trans. of Irish ballads in J. Hardinans' *Irish Minstrelsy* (1831), polemical works, such as *The Doctrine of the Trinity* (1827), *Original Sin* (1832); and biographies of A. H. Rowan, (1840), Michael Servetus (1848), and others.

Drummossie Moor, see CULLODEN.

Drumright, city of Creek co., Oklahoma, U.S.A., with oil refineries. Pop. 4900.

Drunkenness, or Inebriety, may vary from a state of hilarity, mental excitement or exaltation to complete coma or unconsciousness, ending possibly in death. It may be an occasional lapse or an habitual and chronic state of alcoholism. It may be the cause of foolish and disorderly behaviour, or the symptom of deep-seated fatal diseases, or of insanity. It may lead to a fine for a condition of helplessness in the streets, or to a long term of imprisonment or capital punishment for brutal assault or a murder. Medically or physiologically D. is a condition of intoxication or poisoning due to the consumption of an excessive amount of alcohol, either in rapidly taken doses, or spread habitually over a period of time, with a cumulative effect. The outward signs of alcoholic intoxication, the thickening of speech, blurred or double vision, inability to maintain equilibrium, etc., are due to paralysis of various parts of the nervous system. Pathologically it includes acute alcoholism, in various stages leading to complete coma, delirium tremens, and chronic alcoholism, with its most usual results of various profound nervous disorders, impaired digestive powers, cirrhosis of the liver, etc. A proof of the effect of alcohol on the nervous system is found in the fact that in post-mortem examinations traces of it may be found in the cerebrospinal fluid when it has disappeared in every other organ. The modern treatment for D. is on psychological lines, the theory being that D. is usually an attempt to escape from, and is thus a symptom of, mental conflict. If the underlying cause can be cured the D. disappears. Viewed racially it may at once be recognised that D. is far more prevalent among the races of N., damp, and cold climates than in the S. Scandinavia, N. Russia, and Scotland are in marked contrast to Italy, Spain, Portugal and S. France. The comparison of national drink bills, based on consumption per head, is usually fallacious; it is the kind of alcohol taken, i.e. whether light wines or beers or ardent spirits, and the manner of consumption, i.e. as part of the daily diet or crowded into a few

hours, that makes the difference as far as the national health is concerned. The inter-relation of hereditary alcoholism is not thoroughly worked out. To some the result of past alcoholism should tend to an immunisation, racially if not individually. In the eyes of the law, D. does not affect a man's civil capacity; he may make contracts, wills, marriages, etc., as long as he is capable of knowing what he is doing and no undue advantage is taken of his state. So, too, as regards criminal responsibility, but in those crimes where a criminal intention is essential, his state may be taken into consideration. See further under CRIMINAL LAW. As an offence in itself, the law looks first to the effect: it is not an offence to be drunk *per se*, but only if it be accompanied by disorderly conduct in a public place or leads to a breach of the peace; or it is an offence to be drunk and incapable in a public place, or drunk in a licensed house, or when in charge of a vehicle of any kind or the like. Stringent laws regulate the offence of selling drink knowingly to drunken persons or to known inebriates, or of permitting drunken persons to remain on licensed premises. Finally, the law takes into account habitual drunkards in the technical phrase, inebriates. They may be voluntarily committed to abstain from visiting licensed houses for a maximum period of two years, which can be extended on application.

Drury, Dru (1725-1803), an Eng. naturalist. His cabinet collections of home and foreign insects were much prized, and his writings did much for the advancement of entomology. Linnaeus, J. E. Smith, Kirby and others thought very highly of D. His chief works are *Illustrations of Natural History* (1770-82), *Directions for Collecting Insects in Foreign Countries* (1800); *Thoughts on the Precious Metals* . . . (1801), *Ezotic Entomology* (ed. by J. O. Westwood with Memoir, 1837). Moses Harris drew the many plates and figures accompanying these works.

Drury, William Price (1861-1949), son of an Eng. naval officer, educated at Brentwood School, Essex, and Plymouth High School. Saw a considerable amount of service at sea on China and Mediterranean stations and elsewhere. From 1900 to 1901 he was a member of the Naval Intelligence Department. He is the author of *The Flag Lieutenant* (1908), a successful play produced at the Playhouse; *In Many parts: the Memoirs of a Marine* (1926); *Eight Bells* (1932); also a film: *The Further Adventures of the Flag Lieutenant*.

Drury Lane, thoroughfare of London, England, extending from Aldwych to Broad St., St. Giles', and High Holborn. It is named after Drury Place, a fifteenth-century house owned by the Drury family. It was in this house that Essex planned the rebellion of 1600. On its site in 1805 Astley built the Olympic Pavilion. D. L. with its theatre, has an historic past. Neil Gwynn was b. in Drury Court and followed her trade by the D. L. theatre. It was from this

thoroughfare that a serving man first raised the alarm on the outbreak of the plague. Other famous names associated with the dist. are Campbell, Donne and Lamb. See also next article.

Drury Lane Theatre, famous London playhouse in Covent Garden, one of the oldest existing in London, deriving its name from the old Cockpit or Phoenix Theatre (c. 1616), actually in Drury Lane, where Killigrew acted, before granted a patent by Charles II. (1663) for opening a new one. This was known as the Theatre Royal, and opened by Killigrew and his company called the 'King's Servants.' A fire destroyed this first house (1672), and it was rebuilt by Wren (1674). In 1682 the 'Duke's Servants' under Davenant joined Killigrew, and both companies played together at Drury Lane. There was a secession under Betterton to Lincoln's Inn Fields (1694), and by 1709 the theatre was closed. Collier took over the management in 1710, Lacey in 1744, soon being joined by Garrick. Among noted actors who performed here in the eighteenth century were Colley Cibber, Doggett, Wilks, Quin, Macklin, Pritchard, Kitty Clive, 'Peg' Woffington, and Mrs. Siddons. Garrick was manager from 1746-76, opening with Dr. Johnson's prologue (1747), and the triumphs of himself and his company renewed the prosperity of the theatre. In 1784 Kemble made his first London appearance as Hamlet, becoming manager in 1788. The house was pulled down in 1791, reopened by Sheridan (1794), but again burnt down in 1809. The present house, built by Wyatt, was opened in 1812, with a prologue by Lord Byron. The committee's advertisement for this prologue gave rise to the *Rejected Addresses* of J. and H. Smith. The interior was rebuilt in 1822, the present seating capacity being about 2500. Kean and Macready won fame here in the early nineteenth century. Famous for annual pantomimes held there under the management of Sir Augustus Harris and Arthur Collins, for musical comedy, and spectacular pieces, and melodrama, such as *Ben Hur* (1902), *The Whip* (1909), *Everywoman* (1913), *Cavalcade* (1932). In 1917 it was used by Sir Thomas Beecham for opera. See *Pepys's Diary*, 1663; E. Stirling, *Old Drury Lane*, 1881; J. Doran, *In and About Drury Lane*, 1881; W. Macqueen-Pope, *Theatre Royal: Drury Lane*, 1946.

Druses (Druzes) anct. race and religious sect of Syria, of much-disputed origin. They are variously said to be Arabs from the Yemen; of Chinese stock; and descended from the Kurds with whom Esarhaddon repopled Samaria after the second captivity of Israel. They are also regarded as Iranians. Their numbers are impossible to estimate with any degree of accuracy, but they have been assessed at 110,000. They live chiefly in the mt. regions of Lebanon and Anti-Lebanon and in the dist. of Hauran. They call themselves Muwahhidin ('Unitarians'), but are known to others as 'D.', a name probably derived from Ismail Darazi or Durzi (confessor of Hakim), their first

apostle in Syria. He was forced to flee for refuge to Lebanon, 1016, after preaching publicly the divine incarnation in Hakim, one of the seven cardinal beliefs of the sect. Others connect the name 'D.' with various Arabic words. Hamzé, a Persian disciple of Hakim, gave the Druse faith its settled form. They mingle teachings of the Pentateuch, the Christian gospels, the Koran, and the Sufi allegories, and believe in one God. They hold that the Diety has on no fewer than ten occasions been made manifest in human form, the last occasion being in the person of Hakim, the Nero-like Fatimite Caliph of Egypt (966-1021). One tenet of their faith is that the number of souls is definite, and that when one man dies his spirit assumes another fleshly cloak and lives a life conditioned by classes of Akals (Initiated) and Djahils (Un-initiated). Both classes look forward, as a prelude to the end of the world, to an Armageddon between Islam and Christendom, and celebrate their religion in mysteries. A most fanatical and warlike people, they have revolted against all their rulers—the Turks, the Egyptians, and in late years the Fr. They yet discourage proselytism and Mohammed is not accepted by them as an incarnation of the Deity. In the seventeenth century Emir Fakr-ed-din MAZD. II., a noted Druse leader and the most famous figure in the hist. of the race, annexed Beirut and Sidon, and menaced Damascus. He intrigued with the Christians, and was executed by the Turks (1635). In the eighteenth century the Turks and D. revolted against Egypt, and the famous Emir Beshir was exiled to Malta, dying at Constantinople, 1851. From 1840 to 1860 there was endless bitter strife between the D. and the Maronite Christians. After the Maronite Massacres of 1860, the Fr. interfered (1861) and in 1864 the European Commissioners drew up a new constitution for Lebanon under a Christian governor chosen by the Porte, Daoud Pasha being the first. He founded an educational establ. at Aboey. There was a fierce revolt in 1925 against the Fr., who held the mandate for Syria, and the revolt was crushed with extreme severity by General Sarrail. The D. fled to Hadithah, some 80 m. distant, where they now dwell in a city of tents by some deserted wells, through the clemency of Ibn Sa'ud, King of Saudi Arabia (Saudia). In the old days the D. were famous silk manfs., and they still carry on the trade, chiefly at Shilman; but the nomad section of the people under Attrash eke out a hazardous existence by gathering salt from the basalt gravel of Hadithah. A little corn also is raised by those still in Syria. Deir-el-Kamr is their chief city, but Baklin (near by) later became their headquarters. Kunarvat is the chief tn. of the Hauran dist. See S. de Saoy, *Exposé de la religion des Druses*, 1838; P. Wolff, *Die Drusen und ihre Vorläufer*, 1842; Earl of Carnarvon, *Druses of the Lebanon*, 1860; C. H. Churchill, *The Druses and Maronites under Turkish Rule*, 1840-60, 1862; L. Oliphant, *Hadfe*, 1887; Ger-

trude Bell, *The Desert and the Son*, 1907; J. F. Scheltma, *The Lebanon in Turmoil*, 1921; B. H. Springett, *Secret Sects of Syria and the Lebanon*, 1922; L. Stein, *Syria*, 1925; P. K. Hitti, *The Origins of the Druse People and Religion*, 1928.

Drusus, Marcus Livius, (1) Rom. tribune of the plebs in 122 B.C., but a supporter of the aristocracy. After passing a veto on a popular measure proposed by Gracchus, his democratic colleague, he proposed the same measure himself in order to prove to the people that the patricians were their best friends. The success of this policy earned him the sobriquet of 'patron of the Senate'. (2) Son of the preceding: Rom. tribune, 91 B.C. an aristocrat: pursued the same course as his father, but was baffled in the execution of his purpose, which was to broaden the constitution and admit the its. to citizenship; in consequence of which he formed a conspiracy but was assassinated. This led to the Social war.

Drusus, Nero Claudius (Germanicus) (38-9 B.C.), Rom. general, was the adopted son of the Emperor Augustus and the younger brother of Tiberius. Horace, in one of his odes, has celebrated D.'s campaign against the Rheti and Vindelici, who threatened the Gallic frontiers, but historically D. is remembered for the subjugation of Germany by his victories over the Usipetes, Sugambri, Chatti, and Suebi, and by the fact that he was the first Rom. general to reach the Elbe. Had not an accident caused his death in early manhood, it seems likely that his winning manners, strategical genius and brilliant success, which had combined to win him an extraordinary popularity, would have enabled him, had he chosen, to overthrow the empire.

Drusus Cæsar (c. 15 B.C.-A.D. 23), son of the Emperor Tiberius and Vipsania Agrippina, after being twice consul, and winning victories in Pannonia and Germania, was given the tribunician authority by his father, a sign that one day he would inherit the empire. But he died early in life, being slowly poisoned by the ambitious Sejanus, who had also seduced Livia, his wife.

Druses, see DRUSES.

Dryads, in Gk. mythology, the nymphs of the trees. Each *δρυς* (tree, especially oak) was the home of its own particular D., whose life was bound up with that of her tree (*Hamadryad*, *ἡμαδρυς*).

Dryas, of the order Rosaceæ, consists of two species of Arctic plants. *D. octopetala*, the mt. avens, grows in Alpine dists. of Europe, on Scottish and Irish mts., and in Yorkshire. The plant is procumbent, with simple leaves, a woody stem, and white flowers; after fertilisation the style grows feathery, and the fruit is oval and long-tailed. *D. depressa* has been found in Ireland.

Dryburgh (Gaelic *Dárbach-bruach*, bank of oaks) Abbey, beautiful monastic ruin in S.W. Berwickshire, Scotland, on the R. Tweed, 4 m. from Melrose. It was founded about 1150, probably by David I. Burned by Edward II. (1322), it was partly restored by Robert the Bruce.

Under Richard II. it suffered again (1385), and was reduced to ruins by Bowes and Latoun (1544), and by the Earl of Hertford's expedition (1545). The style is mainly Early Eng. and Transitional Norman. St. Mary's aisle in the N. transept has the tomb of Sir Walter Scott (1771-1832), and of J. G. Lockhart, his biographer. The yew near the chapter-house is at least as old as the abbey itself.

Dry-cleaning, operation for cleaning textile and similar materials and fabrics, and articles made of them (e.g. garments, curtains, etc.) without the use of water.

M. Struan, *Home Dry-cleaning and Laundrywork*, 1933.

Dryden, John (1631-1700), Eng. poet, b. at Aldwinkle, Northamptonshire. He was descended on both sides from anct. families, which had at this time strong leanings towards the Puritans and against the monarchy. He was educated at Westminster School under the famous Dr. Busby, and later proceeded from there to Trinity College, Cambridge. In 1649 had appeared his first contribution to poetry in the shape of a poem commemorative of the death of Lord Hastings. In 1654 he



DRYBURGH ABBEY

W. F. Mansel

It depends on the fact that oils and grease are soluble in certain organic liquids, such as petrol, acetylene tetrachloride, carbon tetrachloride, alcohol and acetone, and that when the greasy substance has been thus removed the residual particles of dirt may be eliminated by brushing, by the use of vacuum extractors, or by other mechanical means. The great advantage of D. C. is that it does not spoil the shape of the articles cleaned, and very rarely affects their colour in any way. Modern dry-cleaning plants operate on a large scale, and economy is effected by recovering the solvents after use. In early days, the process of D. C. was attended with serious risks of fire owing to the inflammable nature of the solvents employed, but the advance of chemical research has provided the dry-cleaner with excellent non-inflammable liquids; these are quickly replacing the solvents formerly employed. For home use, light petroleum, or 'petroleum ether,' is a good general solvent, but it very readily takes fire, so that it must be employed with caution.

took his bachelor's degree, and in the same year his father died, leaving him property worth about £60 a year. He seems to have remained at Cambridge during the following three years, although this is not quite certain. In 1657, at any rate, he seems to have taken up his residence in London, where, in all probability, he lived under the protection of his cousin, Sir Gilbert Pickering. In 1659 appeared his stanzas commemorative of the death of Cromwell. In 1660 he pub. *Astræa Redux* in honour of the Restoration, and followed this up by a panegyric in honour of King Charles's coronation in the following year. Without attempting any disguise, he proclaimed frankly that he was endeavouring to obtain as much money as he could, and in the preface to four of his plays he owned that he would force his genius to perform that which the humour of the public demanded. The taste of the public was not over choice, and yet D., in his first attempt to satisfy that public taste, overstepped even the wide limits of the decency of the Restoration age.

In fact, this general criticism may be made of all his plays, that in an age when decency was at a discount, he successfully managed, by the virulence of his indecencies, to exceed the limits of the time in almost every case. This is not altogether to be wondered at, since he was forcing his genius to perform something for which it was totally unsuited. The *Wild Gallant* (1663) was a failure, but D. learnt from his lack of success, and the *Rival Ladies*, produced in the same year, was more of a success. In the same year he collaborated with Sir Robert Howard in the composition of *The Indian Queen*, which proved a great success in 1664, and in the same year he married the Lady Elizabeth Howard. In 1665 appeared from D.'s pen alone *The Indian Emperor*, which was also a great success. In 1666 appeared his poem *Annus Mirabilis*, which commemorated the Dutch War and the Great Fire in the heroic stanzas of the Cromwellian ode. Between the appearance of this poem and 1681, D. appears to have confined himself entirely to stage plays. He wrote many during this period, and these plays may be divided into two distinct classes: the one following the general tendency of the day and attempting to make up by their ribaldry for their want of genius; the other, dramas founded upon striking incidents in the hist. and mythology of the world. In the former, for reasons already given, he was almost uniformly unsuccessful, in the latter his success was really popular. He was at this time under contract to Shelley's Theatre to write three plays a year, receiving in return about £400 per annum. He failed to fulfil the conditions, producing only about ten plays during the ten years during which he was under contract. Amongst the plays which he produced at this time (not all under the contract conditions) are: *Secret Love* (1667), *Sir Martin Mar-all* (1667), *An Evening's Love* (1668), *Tyrannick Love* (1669), *The Conquest of Granada by the Spaniards* (1670, 1671), *Marriage à la Mode* (1671), *The Assignment: or Love in a Nunnery* (1672). The extravagant boasting of the preface to the *Conquest of Granada* was the cause of the production of the *Rehearsal*, a play written in burlesque principally by the Duke of Buckingham. In 1670 D. had become poet laureate. In 1674 he attempted to turn *Paradise Lost* into rhymed couplets, having, it is said, the permission of Milton 'to tag his verses.' *Aureng-Zebe* was the last of his rhymed plays, and was pub. in 1678. In 1677 appeared *All for Love*, a version of the story of Antony and Cleopatra, but written from an entirely different point of view from that of Shakespeare. A comparison of the two plays leaves us entirely convinced that Shakespearean drama was the highest form, but it gives us also a very much greater opinion of D. than can be obtained from any of his other plays. Other plays which D. wrote subsequently to this are: *Edipus* (1678), *Troilus and Cressida* (1679), *The Spanish Friar* (1680), *The Duke of Guise* (1682), *Albion and Albanius* (1685), *Amphitryon*

(1690), *King Arthur* (1691), *Cleomenes, The Spartan Hero* (1692), and *Love Triumphant* (1694). D., after abandoning the rhymed couplet, adopted satire as the instrument of his genius, and pub. in 1681 *Abalom and Achitophel*, after having been mistaken for the author of a previous satire. This satire was written from the court point of view, probably with the idea of gaining favour for himself, and was certainly immensely popular. Ed. after ed. sold rapidly, and certain it was that D.'s satire was appreciated. He had not the faculty of delicate satire, but the blows which he struck were hard. His next satire was *The Medal* (1682), a poem written in savage commemoration of the medal struck when Shaftesbury was acquitted. He attacked and attempted to demolish Shadwell in the poem *Mac Flecknoe, or a Satyr upon the True-Blew-Protestant Poet, T.S.* (1682). In 1682 appeared *Religio Laici*, which attacked the Papists and still more bitterly urged on the persecution of the Non-conformists. On the accession of James II. in 1685, D. became a Catholic. By many his conversion has been held to be the result of sincere conviction, while, on the other hand, the majority hold that it was merely another example of his time-serving characteristics. Be that as it may, he wrote a poem, *The Hind and the Panther* (1687), in which he strongly advocated the faith of his new religion. The Revolution of 1688 found him still unchanged, and as a result of his Catholicism he lost his office of poet laureate, and had to fall back upon his pen for his living. In 1693 appeared some trans. of Ovid and Homer, and almost immediately afterwards he set to work on a complete trans. of Virgil, which appeared in 1697. This was followed by the famous second ode on *St. Cecilia's Day*. His last work, pub. a few months before his death, was the *Fables*, principally founded on the stories of Boccaccio and Chaucer. During the later part of his life he had been dependent on the trans. for his daily bread, and he also seems to have received presents from his friends. As a translator he rendered Virgil, Juvenal, Ovid, and Chaucer, and the best of his prose is the preface to his *Fables* of 1700, in which, in the year he died, he introduced some of his trans. to the public. Although deprived of his position as laureate, he still continued to be recognised as the greatest living poet, and he lived without fear of molestation from the gov. and respected by all. He died on May 1, 1700. By his conversion he became the literary parent of the greatest poet of the succeeding age, Pope. His genius is undoubted, and showed itself principally in his ability to imitate and to excel those whom he imitated. He had no great originality, yet his position as one of the greatest of our poets remains. He estab. little, yet he excelled all. In the heroic couplet, the decasyllable quatrain, and in blank verse, he displays equal mastery. But it was in the heroic couplet that he wrought his most striking effects. His couplet lacks the chiselled precision of form and epi-

grammatical brilliance achieved by his successor in verse satire—Pope—but has a richer and more vital content; and as a master of prosody D. ranks with the greatest of all Eng. poets. Like Johnson, D. was the literary dictator of his age; presiding at Wills' Coffee House in unquestioned supremacy among the contemporary wits. Among the collected eds. are: complete works ed. by Sir W. Scott (1808, 1821), revised by G. Saintsbury (1882-92); poems, ed. by W. D. Christie (1870), and B. Dobree (Everyman's Library, 1934); plays, ed. by W. Congreve (1717) and M. Summers (1931-1932); prose, ed. by E. Malone (1800) and W. H. Hudson (Everyman's Library, 1912). Bibliography by H. Macdonald (1939). See G. Saintsbury, *Dryden*, 1881; R. Garnett, *The Age of Dryden*, 1895; M. Van Doren, *The Poetry of John Dryden*, 1920, 1931; Sir W. Raleigh, 'John Dryden and Political Satire,' in *Some Authors*, 1923; T. S. Eliot, *Homage to John Dryden*, 1924; C. Hollis, *Dryden*, 1933; N. B. Allen, *The Sources of John Dryden's Comedies*, 1935.

Dry Farming. In those areas where the rainfall is limited it is necessary to adopt special measures in order to secure the fullest benefit from all natural sources of irrigation. Experience has shown that the twofold problem of trapping all the rain that falls and of securing that it shall not easily trickle away is best met by treating the upper surface and the lower soil in two different ways. The surface soil is broken up and treated in a manner that makes it specially permeable by moisture so that as much as possible of any rainfall shall be immediately absorbed; while the lower soil is kept in a clogged and clay-like condition that retains the water thus secured.

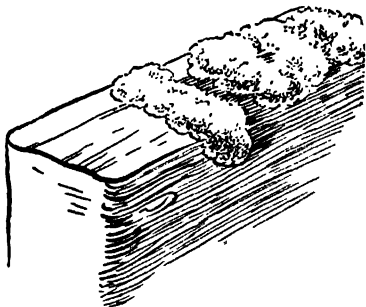
Drying Machines. devices for drying textile materials. Those for drying printed calicoes or long webs of similar fabrics usually consist of a series of revolving metal cylinders heated from within by steam. The machine commonly used in bleaching or laundry-works is formed of two drums or cylinders open at the top. The articles to be dried are placed in the inner one, which is made to revolve at high speed. The moisture is forced out by this centrifugal action through the perforated sides of the inner into the outer drum, whence it is drained off by means of a pipe. Open-air or hot-chamber drying usually completes the process. The ordinary 'wringer' or 'mangle' has two rollers mounted parallel one above the other, with an adjustment by means of which the distance between them can be varied. The black-man air-propeller is used for drying wool by drawing heated air through it. Slightly different apparatus is used in paper manuf.

Dryopes. Pelagic tribe who first settled round Mt. Eta, in Thessaly, Greece, in the dist. called after them 'Dryopis,' extending N. to the R. Spercheus.

Dryophis (Gk. *δρῖς*, a tree; *ὄφις*, snake), generic name of the whip-snakes, non-venomous reptiles, native to tropical America, W. Africa, and India.

Dry-point, see ENGRAVING.

Dry Rot, species of decay which attacks timber in certain instances. The chief fungi responsible for the destruction are *Merulius lacrymans*, *Polyporus destructor*, and *Polyporus hybridus*. Stagnation of warm, humid air, insufficient drying of the timber, and the felling of trees in the spring, when the sap is full, are all likely to lead to D. R. It has often been decreed that timber should be felled in



DRY ROT FUNGUS
Merulius lacrymans

winter only, so as to prevent sap fermentation. Submerging wood in water 'seasons' it by dissolving or at least changing, its putrescible material; whilst in modern times timber is preserved by being crosoted, burntissed (treated with zinc chloride), or kyanised (treated with corrosive sublimate).

Dual Alliance, secret defensive alliance made between Russia and France in 1892 and nullified by the Russian Revolution of 1917.

Duala, or **Douala**, tn. and harbour in Fr. Cameroons, W. Africa, the most important port of C. for palm oil products. Has a hospital, schools, three missions, shipyard and railway workshops. In the 1914-18 war it was captured by the Brit. forces on Sept. 26, 1914. Pop. (estimated) 3000.

Dualism (Lat. *duo*, two), philosophical term applied to any system of thought which rests on two co-existent and independent principles. It is the opposite of Monism. The earliest dualist was Plato, who held that good truly exists, but in combination with evil, which is non-existent. Aristotle believed form and matter to lie at the bottom of all things. Descartes arguing from his proposition 'Cogito, ergo sum,' maintained the absolute D. of consciousness or thinking (*res cogitans*), and extension (*res extensa*). In theology, D. assumes the separate existence of two underlying principles, good and evil, as in the doctrine of Zoroaster which postulates two contending deities, Ormuzd and Ahriman. In Christianity arises the difficulty of reconciling the omnipotence and perfect good-

ness of God with the existence of evil and pain. See A. Schweitzer, *Civilisation and Ethics*, 1923.

Dual Number, grammatical term denoting a form of a noun, pronoun, or verb, employed with regard to two things. Thus in Gk. the dual form of *γῖας*, giant, is *γίῳρες*, and the plural *γίῳρες*. The D. N. existed in Sanskrit, Arabic, and Heb., but in Latin we only find it in two words, *duo* two, and *ambo* both. The D. N. is rare in the Teutonic languages. In O.E. the dual forms exist in the declension of *ic*, I, and *du*, thou, only. They are, of the former, nom. *wił*, acc. *uncil*, unc. gen. *uncer*, dat. *unc.*; of the latter, nom. *gil*, acc. *incit*, inc. gen. *incer*, dat. *inc*. In Gothic, they are found in the declension if *ik*, I, and *pu*, thou, and in the verbs. For example, the second person imperative of *sōkjan*, to seek, has three numbers: sing. *sōkei*, dual *sōkjats*, plur. *sōkeip*.

Du Barry, Marie Jeanne Gomard de Vaubernier, Comtesse (1746-93) mistress of Louis XV., b. at Vancouleurs, Meuse. She entered a milliner's shop in Paris at the age of sixteen, and became the mistress of the dissolute Jean, Comte du Barry, through whom she met Louis XV. Her beauty and wit attracted the attention of the old king who before long made her his official mistress at court, after merely formal marriage with Jean's brother Guillaume. After Louis' death in 1774 she was obliged to live in retirement at Luciennes, and on the outbreak of the revolution she came to England to raise money (1792), but was arrested and beheaded on her return (1793). See Lives by C. Vatel, 1882-83; R. B. Douglas, 1896; K. von Schuhmacher, 1931.

Du Bartas, Guillaume de Saluste (1544-90), Fr. poet, b. at Montfort in Armagnac; followed the profession of arms; served Henry IV., and died from wounds received at the battle of Ivry. His poem, *La Semaine, ou Creation du monde* (1578) which was probably imitated from Tasso's *Sette Giornate*, went through thirty eds. in six years, and was trans. into six languages. He was greatly admired by Spenser. Indirectly he served to enrich the Eng. language by compounding words which were imitated by Sylvester (his translator), Chapman, and Sir Philip Sidney.

Dubbo, tn. in Lincoln co., New South Wales, Australia, situated on the Macquarie R. Coal and copper are found in the neighbourhood, and the tn. has flourishing manufs. Pop. 8400.

Du Bellay, See BELLAY, JOACHIM DU.

Dubica, fort. tn. on the r. b. of the R. Unna, Croatia, Yugoslavia. There were terrible battles here between Turks and Austrians in 1788. Pop. 5700.

Dublin, cap. of Eire, in the prov. of Leinster, in the co. of D., stands at the mouth of the riv. Liffey where it enters the Irish Sea. It lies in the lat. 53° 20' 3" N. and in long. 6° 17' 30" W., 334½ m. W.N.W. of London (via Holyhead route) and 138 m. W. of Liverpool. D. is enclosed by the Circular Road, 9 m. in circumference and the city is divided into

two parts by the Liffey, which is crossed by twelve bridges, six being iron (including a swivel) and six stone.

D. is an anct. city and like most other cities its hist. and development have been influenced by its riv. The name Dublin is a compound of two Irish words—*Dubh*—*Linn*—meaning 'Black Pool', while the old Irish name, *Baile-atha-Cliath*, which is in use to-day, means 'Town of the Hurdles' from a ford constructed of hurdles across the Liffey. The Danes or Ostmen first appeared in Ireland towards the end of the eighth century, and in A.D. 836 they sailed a fleet up the Liffey and captured the city. D. became the cap. of their colonies in Leinster, and thence onwards the cap. for each successive conquest of Ireland. The Danes were defeated at the battle of Clontarf in 1014 and their power broken for ever. In 1170 the Anglo-Norman invasion began, and in 1172 Henry II. landed in D. The Normans walked in the city, built the castle, rebuilt Christ Church upon the Dan. foundation, and built a second Cathedral, St. Patrick's, outside the city walls. In 1317 D. was again threatened with invasion by Edward Bruce, and part of the city was burnt down as a precautionary measure. The hist. of the years which follow is one of siege and internal disorders, long contests for supremacy between the great Norman families, and constant attacks upon the city by the native clans. Viceroy after viceroy came over, sometimes a prince of the blood, and finally, in an attempt to maintain control, episcopal viceroys were sent. So for a number of years the citadel was built by ecclesiastics, which accounts for the dozen abbeyes and some twenty churches in a tn. half a m. long and a quarter of a m. wide. During the wars of the Roses, D. made little progress: Richard, duke of York, was sent as viceroy; an Irish Parliament declared that Eng. law had no validity in Ireland, and the viceroy made himself into an independent king; famine, pestilence, and fire followed each other at regular intervals and industry came to a standstill. In the sixteenth century or Tudor times, the native clans having been conciliated to some extent, the cap. was comparatively free from attack and began to spread outside its walls. The Reformation reached D. in 1535 with the appointment of Archbishop Browne, the first Protestant to the See. The doctrines never took root in Ireland, but D. as the seat of gov. was forced to conform. Lands and monasteries were confiscated, churches were destroyed, and in 1591 'The College of the Holy and Undivided Trinity' was founded by Queen Elizabeth on the site of the monastery of All Hallows. In the reign of James I. the medieval walls began to disappear, and the extension of the city was rapid. The revolution of 1641 was followed by twelve years of war when the pop. of the city was reduced to 9000. Following the Restoration there again came a period of peace and D. once more, under the viceroyalty of the 'Great' duke of Ormond, began to expand, and

its numbers reached 40,000. James II. having abandoned two of his kingdoms to Wm. of Orange without striking a blow, decided to fight for the third: the Irish supported a king of their own faith, and so he entered D. in triumph. He proceeded to abolish the Eng. connection and the Protestant estab. Wm. and his general, Schomberg, landed in Ulster and marched on D., and in 1690 defeated James II. at the battle of the Boyne. Once again the city entered on a period of

buildings were badly damaged. With the estab. of the Free State Gov. in 1922, Leinster House, a fine Georgian mansion built for the duke of Leinster in 1745, became the seat of the new parliament.

The powers and privileges of the D. Corporation are derived from a series of Charters dating from 1171, while the Charters of A.D. 1200 and 1215 form the basis of all municipal legislation in Ireland. In 1109 the title of Mayor was introduced. Throughout the centuries the City Council



Irish Tourist Association Inc.

DUBLIN: O'CONNELL STREET AND THE RIVER LIFFEY

improvement: the Library Square in Trinity College was begun; street lamps were erected.

In the eighteenth century the focus of Irish politics was the Parliament House in College Green, resulting in a great influx of the aristocracy into the city, and the building of magnificent streets and squares N. and S. of the riv., and D. became one of the most important and fashionable caps. in Europe. After the failure of the rebellion of 1798 came the abolition of the Irish Parliament and the passing of the Act of Union in 1802. Then onwards the importance of D. began to wane. In the nineteenth century the gov. of Ireland was carried on from D. Castle. The old Parliament House was acquired by the Bank of Ireland, and in 1803 converted for that purpose. During the 1916 rising, and again during the 1922 civil war, some of the most important

has been abolished and reinstated many times. By Act of Parliament in 1930, a City Manager was appointed and by a subsequent Act many of the functions of the Council were vested in him. The City Council while retaining the right to strike the City rate, now acts to a large extent in an advisory capacity. The Council consists of forty-five members, nine of whom are aldermen, each of the nine electoral areas of the city returning five members.

Little remains to-day of the medieval D. but the few fragments of the city walls, and St. Mary's Abbey, the remains of St. Audoen's Church, and the Portiester Chapel, Christ Church Cathedral begun in 1171, though Anglo-Norman and Early Eng. in character, was very considerably restored and rebuilt in 1875. Likewise St. Patrick's Cathedral, dating from 1192, was restored in 1865. In St.

Patrick's Cathedral are monuments to the memory of Dean Swift and 'Stella.' D. Castle dates from 1205. It suffered severely in the sixteenth and seventeenth centuries when a large portion was destroyed by fire. In the eighteenth century the greater part was rebuilt much as it is to-day. The Record Tower is all that is now visible of the original structure. The Chapel Royal, designed by Francis Johnson, was completed in 1814. Amongst the earliest Renaissance buildings in D. was the Royal Hospital, Kilmainham, with its fine chapel and paneled dining hall (1680-82) by Sir Wm. Robinson, and Stephen's Hospital (1700) by Thomas Burgh. As a Georgian city, D. ranks with Bath and Edinburgh. Its golden age of architecture was in the eighteenth century and reached its zenith in the latter half. The new Parliament House was begun by Sir Edward Lovett Pierce in 1729, and the House of Lords (almost unchanged and now the board room of the Bank) was later added by James Gandon. The front of Trinity College (1755-59), the Chapel (1777), and Examination Hall (1777-91) by Sir Wm. Chambers, the Royal Exchange by Cooley now the City Hall (1769-79), the Four Courts (1776-96) begun by Cooley and finished by Gandon, the Custom House (1781-91) by Gandon, acknowledged to be one of the finest Renaissance examples in Europe, the Rotunda Hospital with its lovely chapel with Francini ceiling, the Blue Coat School (1773), are among the more important public buildings. There still remain many fine mansions of the period including Charlemont House, Powerscourt House, Tyrone House, and sev. city churches, etc., etc.

The classical architecture of D. was Palladian in character, but essentially Irish in quality. The tradition went on well into the nineteenth century, notable examples being The King's Inns (1802), St. George's Church (1813), the General Post Office, by Johnson (1811), the Pro Cathedral, Marlborough Street (R.C., 1816), Kingsbridge railway station (1845), Broadstone station (1850), National Library and National Museum (1885-90). The present century has produced few public buildings, but Gov. Buildings, Merrion Street, by Sir Aston Webb (1911), Gov. Offices, Kildare Street (1934), D. Airport (1937), are among the better known. The General Post Office (destroyed 1916), the Four Courts and the Custom House (destroyed 1922) have been reconstructed from the original designs.

The Wide Streets Commissioners, established in 1757, were one of the first Town Planning Authorities in Europe. They functioned until 1840, and were responsible for the spaciousness and stately layout of the city, its streets and squares. The boundary of their activities is bounded, roughly, on the W. and N. by the Circular Rd., and on the S. by the Grand Canal. Their influence lingered on and can be traced in the elegant suburbs of Ballsbridge, Penubroke, Rathmines, etc. In 1914 a competition was

held for a 'Plan for Dublin' and this was won by Prof. Sir Patrick Abercrombie. It was never put into effect, but apart from the necessary alterations which the passing of time demanded, it forms the basis of present-day planning, maintains the Green Belt, and determines the planning of the main arteries leading into the city. In the last twenty-five years the city has grown rapidly, its present pop. is 506,600 (co. 636,000) and considerable housing schemes have been carried out by the corporation and others. In the future it is hoped to provide for the housing needs in 'Neighbourhood Units' to the W., S., and N. of the city, and outside the Green Belt satellite tns. are envisaged.

There are two univs. in the city, the older one being D. Univ. founded by Queen Elizabeth in 1591, consisting of one College—Trinity College. It is partly a residential college situated in the centre of the city in College Green. It has fine buildings and an extensive Park. Its library, containing amongst valuable MSS. the famous Book of Kells, was designed by Thomas Burgh; the Engineering School is by Woodward (so much admired by John Ruskin). (See TRINITY COLLEGE (DUBLIN).) The second univ. is the National Univ. of Ireland represented by one of its three constituent colleges—Univ. College. It was founded in 1911, is non-residential and is housed in a building still incomplete, designed by Prof. R. M. Butler.

Prior to the eighteenth century large ships trading with D. lay to anchor in D. Bay. The modern port is the product of great skill and enterprise. The bar has gone and there is a safe channel for navigation 1000 ft. wide at its entrance, leading right to the heart of the city. At the N. entrance to the harbour is the Alexandra Basin containing 60 ac. of deep water with berthing accommodation for vessels from 24-35 ft. draught. Here also are the shipbuilding and ship repairing yards, and the graving dock and slips. There is further considerable accommodation for large vessels, over 1 m. along the N. side and 1½ m. on the S. side. Adjoining the quays there are large warehouses; silos and mills; and storage tanks for oil and petrol; general storage; and transit pens for cattle, etc. Passenger services connect the Port of D. with Liverpool, Glasgow, Isle of Man, etc. whilst merchant vessels from all over the world use the port.

Commerce and Trade.—The considerable port facilities and the fact that D. is conveniently placed for cross-channel traffic retain for it a large share of Ireland's overseas trade. There is a co-ordinated system of rail and road transport radiating from D. to all parts of the country, while the two canals—the Royal Canal and the Grand Canal, link D. with the country and provide a further means of transport for goods. D. Airport, Collinstown, is situated five m. from the centre of the city, there are direct air services to England, Scotland, and the Continent. There is also a service between Shannon and Dublin forming a link with the United States and other parts of the world. D.

is the headquarters of the prin. Irish banks and has a Stock Exchange. Its Chamber of Commerce is the oldest in the world and was founded in 1783. Whilst D. cannot be described in any sense as an 'industrial' city, it boasts of many flourishing industries to-day. Guinness' Brewery, the largest single source of employment in the country, is known all over the world. Distilling is another important export industry in D., as is also biscuit making. Woollen manufacturing is carried on, also clothing, confectionery, jam-making, motor-car assembly, agric. machinery, and the making of many other commodities formerly imported. Flour milling is well estab. and D. has some important engineering and founding industries. A large proportion of the export cattle trade is operated from D., its cattle market attracting buyers from many countries.

D. has many fine shopping areas, the fashionable thoroughfare being Grafton Street. The city is well provided with recreational facilities. There are five theatres, the best known being the Abbey Theatre, which is the National theatre, and there are numerous cinemas. There are many football and athletic grounds; there are racecourses at Leopardstown, Baldoyle, and Phoenix Park, both for flat racing and steeplechasing. The D. Horse Show, an ann. event, organised by the Royal D. Society (founded in the eighteenth century) is world renowned. In the Phoenix Park, the largest park in Europe, there is the Polo Ground, and also Zoological Gardens. The former Vice-regal Lodge, also in Phoenix Park, is now the house of the President of Eire.

D. is ideally situated, having many attractive seaside resorts, and the D. Mts., within easy reach of the City. Howth, Dun Laoghaire (formerly Kingstown) where the Mail steamers to Holyhead sail from, Dalkey, Killiney, Bray, etc., are among the better known along the coast, while there are many attractive spots inland, such as the valley of the R. Liffey at Lucan, Leixlip, etc.; and Poulaphuca, where the new Liffey Hydro-Electric Scheme has been built, is a well-known beauty spot. Glendalough, famous for its lakes and the remains of the eighth-century monastic settlement, the monasteries at Clonmacnoise and Mellifont, are all within thirty-five m. of D.

See W. Harris, *History and Antiquities of the City of Dublin*, 1766; J. T. Gilbert, *History of the City of Dublin*, 1854-59; 'The Dublin Civic Survey' in *Civic Institute of Ireland*, vol. 2, 1925; D. A. Chart, *The Story of Dublin*, 1932.

Dublin, city, co. seat of Laurens co., Georgia, U.S.A., with cottonseed oil mills, wood-working industries, etc. Pop. 7800.

Dublin Fusiliers, The Royal, formerly the 102nd and 103rd Foot. Both regiments had their origin in independent companies of Foot raised in India by the E. India Co. during the seventeenth century: they were regimented about the middle of the eighteenth century. The 102nd were previously the Royal Madras Fusiliers and the 103rd the Royal Bom-

bay Fusiliers. They were given their numbers on being transferred to the Crown after the Indian mutiny. In 1881 they were linked to form, respectively, the 1st and 2nd Battalions the Royal Dublin Fusiliers, which was disbanded in 1922. A distinguished member of the Madras regiment was Ensign Clive (later Lord Clive) the victor of Plassey. Both regiments took a leading part in all the Indian campaigns, and gained great distinction during the Indian Mutiny, 'Nell's Bluecoats' and the 'Old Toughs', as they were called, always being to the fore. In the S. African War they were especially conspicuous at Wagon Hill, near Ladysmith; indeed it was largely in commemoration of the bravery of the D. F. and other Irish regiments in the S. African War that the Irish Guards were raised. During the 1914-18 war the regiment raised eleven battalions, which served in France, Flanders, Gallipoli, Egypt, and Palestine.

Dubno, tn. in the Volhynia Region of the Ukraine, formerly Poland, 140 m. W. by N. of Zhitomir. The fortress of D. was captured from the Austrian garrison in the First World War in the general advance on the Pripiet and Sereth by Gen. Brussilov (q.v.) in 1916. Pop. 10,000.

Dubois, bor. of Clearfield co., Pennsylvania, U.S.A. It is an important manuf. tn., with iron works, machine shops, and coal mines. Pop. 12,000.

Dubois, Eugène (1858-1941), Dutch surgeon, discoverer of the skull of *Pithecanthropus erectus* (q.v.) in Java, 1891.

Dubois, François Clément Théodore (1837-1921), fr. musical composer, b. at Rosnay, Marne. He studied at the Paris Conservatoire, winning the Grand Prix de Rome with his cantata, *Italia*, 1861. He was choir-master of the church of St. Clotilde 1863-68, and then he accepted the same position in the church of Madeleine, of which he became organist in 1877. He became prof. of harmony at the Conservatoire (1871); prof. of composition (1891); and director, in succession to Ambrose Thomas (1896). His sacred music includes *Les Sept Paroles du Christ* (1867); for the theatre he wrote *La Farandole* (1883), and *Navière* (1895); for orchestra *Hylas* (1890), and *Notre-Dame de la mer* (1897), besides numerous other works.

Dubois, Guillaume (1656-1723). Fr. cardinal and statesman, b. at Brive, in Limousin. In 1687 he was appointed tutor to the young duke of Chartres (afterwards regent duke of Orleans), and contrived to win royal favour by arranging a marriage in 1692 between his pupil and Mademoiselle de Blois, the legitimized daughter of Louis XIV. He became an ambas. in London, and on his return (1701) secretary to his former pupil, and councillor of state (1713). By this time he had acquired tremendous influence over the regent, and practically held the reins of power in his own hands. He negotiated the Triple and Quadruple Alliances (1717, 1718) and forced Philip V. of Spain to dismiss Alberoni. D. secured for himself the archbishopric of

Cambrai (1719) and became cardinal in 1721. See life by L. Wiesener, 1891, and E. Bourgeois, *Le Secret au légent et la politique de Dubois*, 1909.

Dubois, Jacques, see SYLVIVS, JACQUES DUBOIS.

Dubois, Paul (1829–1905), Fr. sculptor, first studied law, then entered Toussaint's studio in 1856. 'Saint Jean Enfant' (1860), 'Saint Jean-Baptiste' (bronze) (1863), and 'Narcisse au Bain' (1867), were among his earlier works. 'Le Chanteur florentin' (exhibited 1865), 'Le Connétable de Montmorency' (1886), and the equestrian statue 'Jeanne d'Arc' (1895), are some of his finest productions. The beautiful 'Tombeau du Général Lamoricière' in Nantes Cathedral is one of his best-known works. After 1873 D. became known as a portrait-painter. 'Mes Enfants' being exhibited in 1876. He painted in Heuner's manner, and produced busts of Henner, Dr. Parrot, Baudry, and others. He became director of l'Ecole des Beaux-Arts, 1878.

Du Bois-Reymond, Emil (1818–96), Ger. physiologist and scientific historian, studied at Berlin and Bonn. He was prof. at the London Royal Institute for three years, with Faraday as his patron, and succeeded Müller in the chair of physiology at Berlin (1858). His researches in animal electricity and the functions of the nerves are especially famous, and he may be said to have created experimental physiology. Among his works are: *Untersuchungen über tierische Elektrizität* (1848–84), *Über tierische Bewegung* (1851), *Über die Grenzen des Naturerkennens* (1872) and *Vorlesungen über die Physik des organischen Stoffwechsels* (1900). See T. W. Engelmann, *Gedächtnisrede*, 1898.

Dubovka, tn. of Stalingrad Region of the R.S.F.S.R., an important port on the Volga, with fishing, fruit, and wine industries. Pop. 17,000.

Dubreka, or **Doubreka**, station of Fr. Guinea, W. Africa, under direct Fr. gov. since 1882. It has much trade with the interior, and good coffee plantations.

Dubrovnik (It. *Ragusa*), tn. in Dalmatia, Yugoslavia, at the foot of Mt. San Sergio, on the Adriatic, 50 m. S.E. of Mostar. The name means 'forest town'; it is indeed the most picturesque tn. on this coast, with its rising fortifications, its round tower dominating the tn. on the landward side, its double line of walls, the pride of D., and its many villas with gardens of cypress and palm, and its main street running along a narrow valley. The harbour is small, but the bay of Gravosa, 4 m. distant, affords safe anchorage for large vessels. D. is a many-towered, walled city, intersected by the Corso, which was once an arm of the sea, and containing many remains of great antiquarian interest, such as the fourteenth-century customs house and the Rector's Palace, late Romanesque; this latter being a masterpiece of Dalmatian architecture rebuilt in the fifteenth century by the architect of Sibenik Cathedral. An earthquake in 1667 killed some 4000 people besides doing much other damage,

though the tn. is still rich in features of antiquarian interest. D.'s chief products are oil, silk, leather, and liqueurs. D. was probably founded in the seventh century, and after changing hands many times was allotted to Austria in 1814. After the First World War it was given to the Yugoslavian state. It was the chief seat of S. Slavic literature. (See SERBIA.) Pop. 14,000.

Dubuque, city and port of Iowa, U.S.A., co. seat of Dubuque co., situated on the r. b. of the Mississippi. It is the seat of an Episcopalian and Rom. Catholic bishop. D. is the oldest settlement in the state, being now a manuf. centre, with saw-works, wagon and boiler-making, tobacco, etc. The lead deposits which are now abandoned were formerly worked by the Indians. Pop. 43,800.

Du Cange, Charles Dufresne, Sieur (1610–88), Fr. scholar and historian, educated at the Jesuit College of Amiens, later studying law at Orleans. His most famous work is *Glossarium ad scriptores mediæ et infimæ latinæ* (1678), completed later by Carpentier, Henschel, Faure (1883–87), followed by a similar *Glossarium . . . græcitas* (1688). He ed. many Byzantine historians: Pausanias Silentiarius (1670), Zonaras (1687), *Chronicon Paschale* (1688). Other works were *Histoire de l'empire de Constantinople sous les empereurs français* (1657), *Historia Byzantina* (1680), and *Les Familles d'outre-mer* (1669). See lives by H. Hardouin, 1849; L. J. Feugère, 1852.

Ducat, gold coin, which came into currency about A.D. 1100, and seems to have been named from a word in the inscription which the Apulian coins of 1140 bore: 'Sit tibi, Christe, datus, quem tu regis, iste ducatus' (Christ, thou rulest this duchy; to thee he is dedicated). The D. which Venice struck in 1280–84 later became known as the zecchino or sequin. Introduced in the fourteenth century to Hungary and Bohemia, and adopted in 1539 by the imperial diet of Germany into the monetary system of the empire, its currency later extended all over W. Europe. The value was about 9s. 4d., but Ds. varied in weight and amount of alloy. It, silver Ds. were worth 3s. 4d.

Duccio di Buoninsegna (c. 1260–c. 1340), It. painter, was the first of the Sienese painters to abandon the Byzantine style of painting, and who may justly be regarded as the founder of the Sienese school. It was he who began the decoration of the pavement of the Sienese cathedral with figures in 'chiaroscuro' (q.v.), and the famous altar-piece he executed for this cathedral between 1308 and 1311 is the only unquestioned work of his still remaining. Painted on both sides, this huge picture (14 ft. by 7 ft.) represents on the one face the Virgin and Child, and on the other twenty-seven episodes from the life of Christ. D. worked also for churches in Florence, Pisa, Lucca, and Pistoja, painting often on gold grounds and left his glorious invention of 'chiaroscuro' pictures in marble as a legacy to the Lorenzetti and his other disciples.

Dučkov, see DUX.

Du Chaillu, Paul Belloni (1835-1903), African explorer and author, b. at St. Petersburg, of Fr. Huguenot parentage, educated in Paris. He early went to the Gabun country, Africa, where his father was a trader. After spending some years in America, he undertook a botanic and zoologic expedition to the Ogowe basin (1855-59). His descriptions of the Abongo pygmies and gorillas (of which he was the first to secure specimens) of the interior in *Explorations and Adventures in Equatorial Africa* (1861), were discredited by many as mere exaggerations. Later investigations, however, proved the truth of his natural hist. discoveries. In 1863-65 he visited Ashango Land, and the Ngunye Falls, the resulting work being *A Journey to Ashango Land* (1867). D. C. explored N. Europe (1872-3), and travelled in Russia (1898-1902). Other works are: *Lost in the Jungle*, (1869), *The Country of the Dwarfs*, (1870), *The Land of the Midnight Sun* (1881), *The Viking Age* (1889), and *Tor the Viking* (1893), are attempts at proving the Scandinavian origin of the Brit.; his last work was *The World of the Great Forest* (1900).

Duchange, Gaspard (1662-1756), clever Fr. etcher and engraver, b. at Paris. He was a pupil of Jean Audran, and became one of the most noted engravers of his period. The 'Io,' 'Danab,' and 'Leda of Correggio' are three of his most celebrated works.

Duchesne, Père, see HÉBERT, JACQUES RENÉ.

Duchy of Lancaster, see LANCASTER, HOUSE AND DUCHY OF.

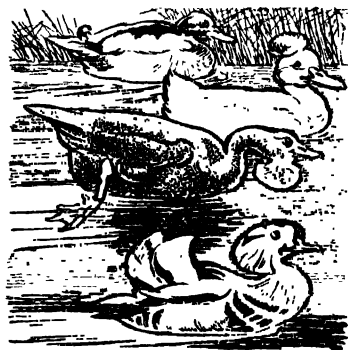
Ducis, Jean François (1733-1816), Fr. dramatic poet, chiefly noted for his adaptations of Shakespeare's plays for the Fr. stage. He succeeded Voltaire in the Fr. Academy, 1779. D. paved the way for Lemaître and the Romantic school. His collected works appeared in 1827. See J. B. Leroy, *Études sur Ducis*, 1835; J. J. Jusserand, *Shakespeare en France*, 1898.

Duck, name given to birds of the family Anatidae, which contains also both swans and geese; it should properly be applied to the female, the male bird being a drake, but it is frequently used to include both sexes. The species are aquatic and have short webbed feet and scaly legs; the bill is broad, depressed and rounded at the tip. There is a great variety exhibited in the coloration of the filthy odd species, and many are very handsome birds. They inhabit N. regions of the world, and as they frequent lakes and seas, their diet consists of such creatures as fish, frogs, and worms. *A. boscas*, the wild D. or mallard, is the species from which all domesticated Ds. have taken their origin.

For domestic use see under POULTRY; and articles on different species.

Duck-billed Platypus, **Duck Mole** or **Ornithorhynchus Anatinus**, Australian mammal which, with the two spiny anteaters, forms the primitive group, *Monotremata* or *Protothera* (q.v.). Except for the fact that the young are produced from eggs, and for the flat beak-like mouth, D. P. bears no resemblance to a bird. It

lives in long burrows on the banks of rivers. The eggs are laid two at a time in a small chamber at the end of the burrows. These eggs have a non-calcareous shell, but like those of birds and other egg-laying vertebrates, have a yolk. The young are believed to hatch very soon after the eggs are laid, and are at first naked and blind. In an early stage, the short fleshy bills are provided with teeth, and these are lost as the animal matures, and hard horny patches developing in each jaw take their place. The oval, flattened body becomes clothed with fur, which is well adapted to an aquatic existence, and the feet are webbed. The fore-limbs are provided with five powerful claws with which the animal burrows. The broad, flat tail is short, and the total length of the body is about 20 in. A horny spur on the hind foot, which is able to inflict a poisonous wound, occurs only in the male.



DUCKS

From top downwards: Mallard, Javanese Pong-duck, Australian musk duck, Chinese Mandarin duck.

Ducking-stool, strongly made wooden arm-chair, fixed to the end of a long wooden beam, in which offenders, such as scolding wives, shrews, and sometimes quarrelsome married couples, were seated, fastened in by iron bands, and immersed in water, the beam being placed at the edge of the pond, or riv. and working on the see-saw principle. In many dists. dishonest bakers and brewers were punished by this ducking system. The earliest record of it is at the beginning of the seventeenth century, and it was in use in England as late as the nineteenth century, the last recorded cases being a Mrs. Gamble at Plymouth in 1808, Jenny Pipes, 1809, and Sarah Locke, 1817, of Leominster, though the last's sentence could not be carried out as there was no water in the pond at the time.

Duckweed, Brit. name for the native species of *Lemna*, the chief genus of *Lemnaceæ*. The plants are perennials, and are found swimming freely in ponds and tanks. The Brit. species are known as *L.*

minor, *L. gibba*, *L. trisulca*, and *L. polyrrhiza*.

Duckworth, Sir John Thomas (1748-1817), Eng. admiral, served in N. America, and the W. Indies. In 1794 he won distinction in Howe's great victory over the Fr. off Ushant. In 1800 he became rear-admiral; commander-in-chief at Jamaica, 1802. D. defeated the Fr. off Saint Domingo (1806). He was sent to dictate terms to the Porte (1807), and failing in his mission retreated from the Turks, forcing the passage of the Dardanelles. From 1810-13 he was governor of Newfoundland; he was knighted in 1813.

Duclaux, Madame Agnes Mary Frances, nee Robinson (b. 1857), Eng. poetess and novelist. She married Prof. James Darmesteter, and, after his death, Prof. Duclaux, 1901. Her works include *The Crowned Hippolytus of Euripides*; with *New Poems* (1881), *Life of Emily Brontë* (1883), *An Italian Garden: A Book of Songs* (1886), *Collected Poems* (1902), *The Return to Nature* (1904), *Life of Emile Durkheim* (1907), *The French Ideal* (1911), *Madame de Sévigné* (1914), *A Short History of France* (1918), *Life of Victor Hugo* (1920), *La Pensée de Robert Browning* (1922), *Life of Racine* (1923), and *A Portrait of Pascal* (1927).

Duclos, Charles Pinot (1704-1772), Fr. author, b. at Dinan, Brittany, sent at an early age to study at Paris. His first pub. of importance was his *Histoire de Louis XI.* (1745) and this was followed by *Considérations sur les mœurs de ce siècle* (1751). He became a member of the Fr. Academy at the early age of 43, and when the post of historiographer of France became vacant by the retirement of Voltaire, D. was appointed to take his place. In the same year (1755) he was appointed permanent secretary of the Academy.

Ductility, property of some metals, such as gold, silver, copper, iron, etc., which renders them capable of being extended by hammering or drawing, without breaking. Glass also possesses the property when in a semi-molten state, and quartz, when in an intensely hot state, can be drawn out into such thin fibres as to be invisible. Wollaston showed that by forming a platinum core inside a silver wire, afterwards drawing out the silver wire, he could, by dissolving the silver coating, obtain a finer platinum wire than he could otherwise have done by drawing out the platinum directly. The wire was so fine that it could only be seen when an electric current was sent through it and made it glow.

Ductless Glands. The function of a gland is the secretion of an individual product, which in most cases passes out by means of a duct; in the case of the ductless glands, however, the secretion passes into the blood by means of capillaries or lymphatic vessels. Examples of ductless glands are the thyroid, parathyroid, thymus, spleen and adrenals. The thyroid gland in the embryonic condition is connected with the pharynx, but by degrees this sac becomes divided from it until at length it is a distinct body. When the internal secretion of the thyroid

becomes excessive, it may result in goitre, and when insufficient it may produce cretinism. *See also* BIOCHEMISTRY.

Duddingston, par., vil. and loch in Edinburgh, Scotland. The vil. is noted as having been the headquarters of Prince Charles before the battle of Prestonpans. The loch lies at the base of Arthur's Seat. Pop. par. 4600.

Duddon, riv. of England, which rises in the Wrynose, on the borders of Cumberland and Lancashire. At Broughton it widens out into an estuary of over 2 m. wide, eventually losing itself in the Irish Sea. Salmon and trout are found above the mouth.

Duderstadt, tn. of Hanover, Germany, with two beautiful fourteenth-century Gothic churches, fifteenth- to sixteenth-century town hall, and many other old buildings. Pop. 7000.

Dudevant, Madame, *see* SAND, GEORGE. **Dudley**, mkt. tn. and municipal co., and parl. bor., 18 m. W.N.W. of Birmingham on two railway lines, in a detached part of Worcestershire, England. The D. canal communicates with the Birmingham canal and the R. Severn. Its active industries of iron- and brass-founding, engineering, glass- and brick-making have sprung up because D. is the centre of a great coal-mining dist. Abundant limestone and fire-clay are found, and fossils of great interest have been discovered in the dist. There are ruins of an eighth-century castle, a free grammar school, and a training college. There are extensive caverns under the castle and the scanty ruins of a priory. The new tn.-hall is a war memorial. Pop. 53,500.

Dudley, Dud (1599-1681), Eng. iron-master, the originator of the use of pit coal for fuel in place of wood, thereby causing a profound change in the methods of iron-founding.

Dudley, John, *see under* NORTHUMBERLAND, DUKES AND EARLS OF.

Dudley, Robert, *see* LEICESTER, EARL OF.

Dudley, Sir Edmund, *see under* EMERSON, SIR RICHARD.

Dudley, Sir Henry Bate (1741-1824), earlier **Bate**, Eng. dramatist and journalist, b. at Penny Compton, Warwickshire. On completing his education he took orders and succeeded his father in the living of North Farnbridge, spending most of his time, however, in London, and leading a life of pleasure. He was one of the first editors of the *Morning Post*, estab. in 1772, his contributions frequently leading him into quarrels, and earning for him the nickname of the 'Fighting Parson.' He wrote eight plays, five of which were produced at Covent Garden, between the years 1774 and 1794. He was also the author of sev. pamphlets and sermons. D. also founded and ed. the *Courier politique et littéraire* (1777), the *English Chronicle* (1779) and the *Morning Herald and Daily Advertiser* (1780). *See* J. Fyvie, *Noble Dames and Notable Men of the Georgian Era*, 1910.

Dudley, Thomas (1576-1658), Brit. colonial governor of Massachusetts, b. at Northampton, England. In 1630 he sailed to America with Governor John

Winthrop, to settle in New England, D. himself being appointed deputy-governor. D. had great influence in Massachusetts, and was governor four times; he was one of the earliest promoters of Harvard College. He had little religious tolerance, being a stern Puritan. For an account of his Amer. voyage, see A. Young, *Chronicles of Massachusetts Bay*, 1846. His son, **Joseph Dudley** (1647-1720), colonial governor of Massachusetts, was born in Roxbury, Massachusetts, and graduated at Harvard College, 1665. He was sent to London to prevent the revocation of the Charter of Massachusetts by Charles II. He secretly used his influence against his mission, to his own advancement. His whole rule was unpopular and his actions dishonourable.

Dudley Limestone, see WENLOCK BEDS. **Dudweiler**, tn. of the Saar dist., Germany, situated on the Sulzbach, 4 m. N.E. of Saarbrücken. There are coal mines, iron works, and manufs. of fire-proof bricks. Pop. 24,000.

Duel and Duelling (Lat. *duellum*, from *duo*, two), in modern significance an arranged combat between two persons to avenge an insult, reflection upon the honour, or to settle matters of private dispute for which the law provides no remedy or such as is not deemed satisfactory. The person aggrieved is the challenger, and the preliminaries and all the arrangements of the combat are settled by the 'seconds,' the supporters of each party. The choice of weapons lies with the challenged party. The combat of two single persons to decide great questions dates back to prehistoric times; the tales of Hector and Achilles, of David and Goliath, indicated the practice, but the D. proper must be traced to a Teutonic institution, the judicial combat of 'wager of battle,' a form of legal trial of questions in dispute, which was regarded as an appeal to God to decide the justice of the quarrel or dispute. The custom spread over N.W. Europe and in 516 the Burgundian king Gundobald legalised the judicial D. Duelling was condemned by Pope Nicholas I. (858-67) and by many succeeding Popes. The judicial combat was only formally abolished by Act of Parliament in 1818, after the case of *Thornton v. Ashford*. In 1385 a judicial combat in the presence of Charles VI. of France between one Jacques Légris and Jean Caronge led to the defeat of the former and the subsequent discovery of the real guilty party, a blow to the popular belief in the justice of the D. from which it did not recover. Duelling thus came to its present form as a means of settling private quarrels, especially among the gently born or the military classes; it was most prevalent in France, especially from the time of Francis I. It had grown to such an extent, and so many men of noble birth were slain, that in 1626 Richelieu confiscated the property of duellists and banished them from France. Stronger measures were required, and beheading was resorted to. In Great Britain, duelling did not become fashionable till the Restoration. The historic

fatal D. between Lord Mohun and the duke of Hamilton is familiar from Thackeray's *Esmond*. In the eyes of the law, a challenge to a D. is a breach of the peace, a fatal result is a homicide, whether murder or manslaughter, and the seconds are accessories. Many historic Ds. have been fought, as those between Pitt and Tierney, Canning and Lord Castlereagh, O'Connell and D'Esterre, the duke of Wellington and Lord Winchelsea. In 1840 Lord Cardigan wounded Capt. Tuckett, was tried by the House of Lords and acquitted. At the present day duelling still occurs in France, but with rarely fatal or serious results. In pre-war Germany, apart from the fencing bouts (*Mensur*) of the various student corps or clubs at the univs., the D. was a matter of serious importance for military officers. Forbidden by law, an officer who refused a challenge, after a decision of a court of honour, must still fight or leave the army. See M. Sutcliffe, *The Practice, Proceedings, and Laws of Armes*, 1593; F. Bacon, *The Charge touching Duells*, 1614; J. Cockburn, *History and Examination of Duells*, 1677, 1720; S. Stanton, *The Principles of Duelling: with Rules*, 1790; A. F. Sieveking, 'Fencing and Duelling,' in *Shakespeare's England*, 1916.

Duet (from It. *duetto*, and Lat. *duo*, two), in music denotes a composition designed for two singers or two players. The term is not properly applied to a composition performed by one instrumentalist and one singer, for it is likely that the former will play a subordinate part (i.e. an accompaniment). Ds. may be written for similar or different instruments.

Dufay, Guillaume (c. 1400-1474), Flemish composer of church music. He learnt music as a chorister at Cambrai cathedral, and became a singer in the Papal choir in Rome.

Dufaure, Jules Armand Stanislaus (1798-1881), Fr. statesman. Under the premiership of Guizot he became councillor of state (1836) and minister of public works (1839). In 1876 he was made Premier, a position which he resigned in 1879 at the termination of MacMahon's presidency. See life by G. Picot (1883).

Duff, or Wilson Islands, group of eleven small is. in the Pacific Ocean, lying to the N.E. of Santa Cruz.

Duff, Alexander William George, see FIFE, DUKE OF.

Duff, Alexander (1806-78), Scottish missionary, b. near Pitlochry, Perthshire, and ordained first missionary to India, 1829. Estab. schools and colleges in India in which religious teaching was combined with science, literature, and other branches of W. learning. He first encountered some opposition, but this soon died down, and he was upheld by gov. officials. D. was one of the founders of the univ. of Calcutta, and helped to start the *Calcutta Review* in 1844, editing it till 1849, and pub. *The Indian Rebellion* in 1858. See life by G. Smith (1879).

Duff, James Grant (1789-1858), historian, b. at Banff, Scotland. In 1818 he was appointed to the important post of resident of Sattara, the centre of the

Mahratta confederacy. His *History of the Mahrattas* (1820) was written on his return to Scotland.

Duff, John Wight (1866-1914), Scottish prof. and author, b. at Dundee. From 1891-93 he was assistant prof. of Gk. at Aberdeen, and from 1893-98 prof. of classics and Eng. at Newcastle. A great scholar, he pub. *A Literary History of Rome* (1909, 1927), *Writers of Rome* (1923), *Minor Latin Poets* (with A. M. Duff, 1934), and *Roman Satire: Outlook on Social Life* (1936), besides various articles in journals and magazines on Gk. travel, trans. from Lat., etc.

Duff Cooper, Sir Alfred, see COOPER.

Duffel, Belgian com., situated to the S.E. of Antwerp, on the R. Nethe. Pop. 9100.

Dufferin, Helen Selina Sheridan, later **Blackwood, Baroness** (1807-67), song-writer, grand-daughter of Richard Brinsley Sheridan, and mother of the Marquis of D. and Ava. Her songs and verses were pub. anonymously, the chief being *Irish Emigrant* (1840) and *Terence's Farewell* (1855). See memoir by her son in her *Songs, Poems and Verses*, 1891.

Dufferin and Ava, Frederick Temple Hamilton-Temple Blackwood, first Marquis of (1826-1902), Brit. diplomatist, b. at Florence. In 1860 was appointed Brit. commissioner in Syria, where his ability and judgment were warmly recognised. From 1872-78 was governor-general of Canada, and during this period inspired the sev. provs. with the true spirit of confederation and with the idea of a great nation within the empire. In 1879 became Brit. ambassador at St. Petersburg, afterwards filling the same position at Constantinople, Rome, and Paris. From 1884-88 he was viceroy of India. In 1897 he was induced by Whitaker-Wright to accept the chairmanship of the London and Globe Finance Corporation, and on learning that it was in difficulties, courageously explained the position to a meeting of shareholders, his own honour being unimpaired. This disaster, together with the death of his eldest son, wounded in the S. African War embittered his last years. His book, *Letters from High Altitudes* was pub. in 1857 (ed. by R. W. Macan in *World's Classics*, 1910). See life by Sir A. Lyall, 1905.

Duffield, small tn. and par. in Derbyshire, England, situated on the R. Derwent. It is $4\frac{1}{2}$ m. N.W. of the tn. of Derby. Pop. 2200.

Dufftown, vil. in Banffshire, Scotland, founded by James Duff, earl of Fife, in 1817. It is a popular resort for invalids, and has whisky distilleries and limeworks. Pop. 1500.

Duffy, Sir Charles Gavan (1816-1903), at an early age drifted into journalism. Going to Dublin to study for the Bar, he founded in 1842 the *Nation*, which from the first became the organ of Young Ireland. In season and out D. therein demanded the cleavage of the union, and sought to band his countrymen together to re-establish, by force if necessary, the Irish Parliament. For preaching open rebellion D. was arrested in 1848, but the

juries disagreeing, he was discharged. He revived the newspaper after his release, but the cause of Irish unity at that time seeming hopeless, in 1855 he abandoned the struggle. He went to Australia, entered the Victorian parliament, and, after holding minor offices, in 1871 became Prime Minister for a short time, and later speaker of the House of Assembly. He wrote sev. books on Ireland, including *Ballad Poetry of Ireland* (1843), and issued a vol. of interesting *Conversations with Carlyle* (1892).

Dufour, Guillaume Henri (1787-1875), Swiss general and cartographer, b. at Konstanz, who after service in the Fr. army, reorganised the Swiss army which he commanded in the war which broke out in 1847 between the Protestants and Rom. Catholics on the question of the suppression of the Catholic Sonderbund. D. quickly brought hostilities to a close, thereby preventing the intervention of foreign powers; and his friendship and negotiations with Napoleon III. were later instrumental in dispelling a threatened war with Prussia. In 1864 he presided over the International Conference which framed the so-called Geneva Convention as to the treatment of the wounded in time of war, etc. But the most important work of his life was commenced in 1833, when the Diet commissioned him to supervise a trigonometrical survey of Switzerland, which he accomplished with complete success at intervals between 1842 and 1865.

Dufourspitze, highest peak of Monte Rosa in the central zone of the Middle Alps on the Swiss-It. S. border. It has an altitude of 15,215 ft., and was named after Gen. Dufour (q.v.).

Dufrénoy, Pierre Armand Petit (1792-1857), noted Fr. mineralogist and geologist, became prof. of Mineralogy and director of the Ecole des Mines, and prof. of Geology at the Ecole des Ponts et Chaussées. In conjunction with Élie de Beaumont, with whom he travelled through France, England, and Spain, D. pub., *Voyage métallurgique en Angleterre* (1827), *Mémoires pour servir à une description géologique de la France* (1841), and *Explication de la carte géologique de la France* (1873).

Dufresne, Charles, see DU CANGE.

Dugdale, Sir William (1605-85), Eng. garter king-of-arms, at an early age showed a love for antiquarian research. Through friendly influences he was in 1638 appointed a pursuivant-extraordinary, and in the following year rouge croix pursuivant with rooms in the Herald's College and a salary of £200 a year. During the Civil war he went from library to library quietly amassing material for the important works upon which he was engaged, viz. the *Monasticon Anglicanum*, the first vol. of which appeared in 1655, and the third and last eighteen years later; the *Antiquities of Warwickshire* (1656), and *The Baronage of England* (1675-76). D. is not always to be relied upon for accuracy, but beyond all question he rendered valuable service to

students of antiquarianism. His autobiography was first pub. in 1713, but the ed. to consult is that of 1827 (ed. by W. Hamper), to which is added his diary and correspondence.

Dugong, or **Halicore**, genus of the mammalian order Sirenia, or sea-cows. The few species are aquatic, usually marine, and in diet they are herbivorous; the existing forms are found in the Red Sea, Indian Ocean, and near Australia. They bear some resemblance to whales, e.g. in the notched tail, and reduced nasal bones, lack of posterior limbs, and in the short neck, but in most of their characteristics they are quite unlike these mammals. The *D.* attains a length of eight feet, and it is said to have originated the idea of the mermaid, for the female has two mammary, holds its young to its breast by means of one of its nailless flippers, and often raises its head out of the water. The teeth of this animal are five or six molars on each jaw, two inches on the upper and four on the lower jaw.

Duguay-Trouin, René (1673-1736), Fr. sea-captain, b. at St. Malo. Originally intended for the church, he abandoned the idea, and went to sea in 1689 on the outbreak of the war with England and Holland. He displayed great courage and made brilliant captures of Eng. and Dutch ships. In 1697 he entered the Fr. navy as commander, distinguishing himself in the War of the Sp. Succession, his most famous action being the capture of Rio de Janeiro in 1711. He subsequently served with the army, attaining the rank of lieutenant-general.

Du Guesclin, Bertrand du, see GUESCLIN.

Duhamel, Georges (b. 1884), Fr. writer, born in Paris. Began his literary career as poet, essayist and dramatist. He qualified as a doctor of medicine without intending to practice. Served in the First World War as a surgeon, and the extremes of physical and mental suffering he witnessed lent him added force as a writer of unguished war books passionately advocating the rights and majesty of the individual soul, his *Civilisation*, pub. in 1918, gaining for him the Prix Goncourt, contrasted with the wrongs and meanness of organised civilisation. But it is his later novels that have won most recognition. *Vie et aventures de Salavin* (5 vols., 1920-32; Eng. trans. of 1 vols. pub. under the title of *Salavin*, 1936), are profound studies of a man who is the idealist in every man, and who tries to live up to a worthy philosophy of life and fails. His ten vol. masterpiece, *Chronique des Pasquiers* (1933-43), presents human beings, not as they try and fail to be, but as they actually are, and his realism differs from that of, e.g., Zola, in that it does not lack sensibility or humour and sympathetic understanding. The 'Pasquier' *Chronicles* were trans. into Eng. by Béatrice de Holthoer. Member of the Fr. Academy (permanent secretary 1943-6) and of the Academy of Medicine and President of the Alliance Française. His works were banned by the Nazis. Other works include *Les Plaisirs et les*

Jeux (1922), a charming study of childhood, *Le Voyage de Moscou* (1927), *Scènes de la Vie Future* (1930), numerous essays and four vols. of autobiography. See D. Saurat, *Modern French Literature*, 1946.

Duikerbok, *Cephalophus grimmii*, genus of small African antelopes (q.v.) with crested heads, large muzzles, and short, conical horns in the males only.

Dullius, Gaius, Rom. general, who defeated the Carthaginians in a great sea fight (260 B.C.). By using grappling irons, he deprived the enemy of their advantage in naval tactics. This was the first naval victory the Romans had ever gained, and the memory of it was perpetuated by a platform, the *rostrum*, erected in the forum, and adorned with the beaks of the conquered ships.

Duino, see under TRIESTE.

Duirinish, parish in the N.W. of the is. of Skye, in Inverness-shire, Scotland, 18 m. long by 15 m. wide, area 80,067 ac., pop. 2600. Lady Grange, a Jacobite heroine, was buried near a pillar called the Trying Stone of Trumpan. Duvagan Castle is the seat of the Macleods of Macleod. This par. was celebrated for its pipers. The hulls called 'Macleod's Tables' rise from the peninsula of D.

Duisburg, on the r. b. of the Lower Rhine, Germany, combined in 1905 with Ruhrort and Meiderich to form one community in the vicinity of the Ruhr coal-field, which favoured the growth of iron and machine-building industries. The tn. is noted also for chemical, tobacco, and textile industries. The combined harbours form the largest riv. port in Europe, and exported coal and wrought iron. The tn. was occupied by Fr. troops from March 1921 till Aug. 1925. In the Second World War great destruction was wrought in D. by bombing attacks on industrial plant, while the damage sustained by the riv. docks and railway marshalling yards in what was the largest inland port in Europe affected rail and riv. communications for hundreds of miles. March troops reached the suburbs on March 30, 1945, and the tn. fell to them on April 13. Pop. 135,000.

Duke (Lat. *dux*, a leader, Fr. *duc*), first came into use as a formal title when Constantine called military governors of provs. either counts or Ds., to distinguish them from the administrators of justice and finance. Under the Franks the Ds., who often ruled sev. provs., became very powerful, whilst the counts, who had once been the most distinguished of the provincial commanders or Ds., now became their lieutenants. Thus the E. Frankish empire was split up into the dukedoms of Swabia, Saxony, Bavaria, Franconia, and Lorraine, and similarly the W. into the duchies of Aquitaine, Burgundy, Gascony, Normandy, and the Ile de France. Although with the strengthening of monarchies the substantial powers of the Ds. waned, the latter still rank next to princes of royal blood. The Black Prince was the first Eng. D., being granted by his father the duchy of Cornwall (1337), whilst the first Scottish king to confer the title was Robert

III., who made his two sons Ds. of Rothesay and Albany respectively (1398).

Duke of Albany's Regiment, see SEAFORTH HIGHLANDERS.

Duke of Cornwall's Light Infantry, formerly the 32nd and 46th Regiments, which were linked together in 1881 to form the D. C. L. I. The 32nd were formed in 1792 as Marines, and were present at the capture of Gibraltar in 1704. Served in Spain in 1705 under Lords Peterborough and Galway. Fought at Dettingen (1743) and Fontenoy (1745). Under Moore it fought at Corunna, and under Wellington during sev. battles of the Peninsular Campaign. For its distinguished conduct during the Indian Mutiny it was made into a Light Infantry regiment. The 46th were raised in 1741, and served for many years in America and W. Indies, India, and Crimea campaign, also Egyptian campaign of 1882, Nile 1881-5, and S. Africa 1899-1902. Raised fifteen battalions for First World War, which served in France, Flanders, Macedonia, Palestine and Aden. In the Second World War the D. C. L. I. took part in the B. of Normandy and other battles on the W. Front. Other units fought on the It. front. They were especially prominent in the dour fighting for Goch and c. the Roer riv. and other battles in the advance to the Rhine and beyond.

Duke of Edinburgh's Regiment, see WILTSHIRE REGIMENT.

Duke of Wellington's Regiment, see WEST RIDING REGIMENT.

Duke of York's Monument, erected by public subscription to the second son of George III., 1830-33. The monument keeps guard over the space of ground where George IV. built Carlton House in his recent days. It is at the end of Waterloo Place on the steps leading into St. James's Park. Made of Scottish granite, the column (designed by Wyatt) is 124 ft. high. It is surmounted by a bronze statue of the duke, 14 ft. high, executed by Westmacott. A staircase leads to the gallery, from which a fine view of the W. End of London and Surrey hills can be obtained, but in recent years it has not been used.

Duke of York's School, Chelsea, called also the Royal Military Asylum, was founded in 1801 by Frederick Duke of York (1763-1827) for soldiers' sons. In 1909 it was removed to Dover.

Duke of York's Theatre, in St. Martin's Lane, London, England. It was opened in 1892 as the 'Trafalgar,' but later received its present name. Among the more notable plays first staged here were Pinero's *Lilly*; Barrie's *Peter Pan* and *What Every Woman Knows*; Galsworthy's *Justice*; the farce *Brewster's Millions*; and the detective drama *Arsène Lupin*.

Duker, Carl Andreas (1670-1752), Ger. classical scholar, studied under Perizonius at Franeker and subsequently brought out the second ed. of Perizonius' *Origines Babylonica et Aegyptiaca* (1736). D.'s magnum opus was his edition of *Thucydides* (1731).

Dukeries, see WORKSHOP.

Dukes, Ashlev (b. 1885), Eng. dramatic critic, playwright and theatre manager. Director of the Mercury Theatre from 1933. Author of *Modern Dramatists* (1911), *The Youngest Drama* (1913), *Drama* (1926). Has written a number of plays, including *The Man with a Load of Mischief* (1924), *One More River* (1927), *Such Men are Dangerous* (1928), *Match-makers' Arms* (1930) *Mandragola* (from Machiavelli, 1930).

Dukes, Sir Paul (b. 1889), Brit. writer and musician; educated at Caterham and Petrograd Conservatoire. Assistant at Imperial Opera, Petrograd, 1914-15. Member of the Anglo-Russian Commission, 1915-1918. Director of Brit. Intelligence service in Russia, 1918-19. *Times* correspondent in E. Europe, 1920. Pubs.: *Red Dusk and the Morrow* (1922), *Adventures and Investigations in Soviet Russia* (1925), *The Story of 'ST25'* (1938), *The Black Horse* (with Ropshin-Savinkov, 1926), *Ballet Russe* (with Nicolas Legat, 1930), and *An Epic of the Gestapo* (1940).

Duke Town, see CALABAR.

Duke University, co-educational institution for higher education estab. in Durham, N. Carolina, U.S.A., in 1924, and named after James B. Duke, from whose endowment fund the cost of its estab. was defrayed. The premises expanded by the addition of a science building, a chapel, library, dormitories, etc. A feature of the univ. is its medical school.

Dukhobors, or **Doukhobors**, Christian community of nonconformist Russian peasants. Their name means 'spirit fighters,' and was applied to them by the Orthodox priests with the implication that they warred against the Spirit of God, but a review of their doctrine and practice shows that they make an earnest endeavour to realise something of the Gospel conception of love and universal brotherhood. Equality, peace, and loving-kindness are their ideals, and although they assemble for public worship, they counsel silent prayer and attach small weight to outward ceremony. Alexander I. banished them to Tauris, and Nicholas I. drove them from their new homes to Transcaucasia (1810-50). Their refusal to obey the law afforded a pretext for this persecution. In this barren region they nevertheless prospered, by dint of sober living and dogged perseverance. In 1895 they burnt their arms to show their disapproval of compulsory military service, and were subjected to the barbarous tyrannies of the Cossack soldiers. Eventually through the offices of Tolstol and the Society of Friends in England, some 8000 were despatched as emigrants to Canada (1898-99), where they were given ter in Saskatchewan.

Dukinfield, municipal bor. of Cheshire, England, 6 m. E. of Manchester. It is situated in the centre of a colliery and manuf. dist., with cotton and calico printing mills, iron foundries, and brick and tile works. Pop. 20,000.

Dulac, Edmund, Brit. illustrator; b. 1882, at Toulouse. As 'Edmond' D., educated at Toulouse Univ., and un-

willingly studied law for two years; for three years attended drawing and painting classes at Toulouse art school, and for three weeks at Julian's in Paris. Illustrated books since 1905. Exhibited portraits at Paris salon, 1904-5. In 1912 he became 'Edmund' D., a naturalised Brit. subject. Illustrations pub. include: *The Bronte Novels* (1905), *Arabian Nights* (1907), Shakespeare's *Tempest* (1908), *Rubdyád of Omar Khayyám* (1909), *The Sleeping Beauty and other Tales* (1910), Poe's *The Bells and other Poems* (1911), *Edmund Dulac's Fairy Book* (1916) Hawthorne's *Tanglewood Tales* (1918), weekly cartoons in *The Outlook* (1919), *The Kingdom of the Pearl* (1920), *Treasure Island* (1927), *The Fairy Garland* (1928), *Gods and Mortals in Lore* (1936); and postage stamps for the Fr. Provisional Gov. (1944).

Dulcigno, or **Ulcinj**, tn. and port of Montenegro, Yugoslavia, situated on the Adriatic Sea, 12 m. S.E. of Antivari. It is built on a rocky cape, and enclosed by forests and hills, which combine to give it a most picturesque appearance. D. was ceded to Montenegro by Turkey in 1880 in consequence of a naval demonstration under Admiral Seymour. In 1919, with Montenegro, it became Yugoslavian. The old quarter is walled and has a medieval castle. Pop. 5000.

Dulcimer, one of the oldest musical instruments, being found in Assyrian mural decorations. The different notes are obtained by striking wires, stretched with tuning pegs across a horizontal sound-chest, with two cork-headed hammers. It is the prototype of the modern piano.

Du Ligier de la Garde, Antoinette, see DESHOULIÈRES, MADAME.

Dülken, tn. of Rhineland, Germany. 11 m. S.W. of Crefeld, and 20 m. W. of Düsseldorf. Pop. 16,000.

Dulmen, tn. of Westphalia, Germany, 17 m. S.W. of Münster. There are iron mines and blast furnaces in the neighbourhood. Pop. 10,000.

Dulong, Pierre Louis (1785-1838). Fr. physicist and surgeon. Pupil of Berthollet and Thenard. Early distinguished for the discovery of chloride of nitrogen, in the preparation of which he lost an eye and two fingers. Collaborated with Berzelius in the analysis of water by the method of passing a current of dry hydrogen over red-hot copper oxide. But it is rather as a physicist that he acquired fame, particularly by his experiments in the theory of heat, to which he applied himself constantly from 1818. He also evolved the air manometer for measuring the density of gases and the cathetometer for measuring small differences of level of different liquids in tubes.

Dulse, popular name given to two species of edible seaweed, *Rhodymenia palmata* and *Ididrea edulis*.

Duluth, important lake port of Minnesota, U.S.A., situated on steep and picturesque slopes at the W. end of Lake Superior. It is second only to New York in commercial tonnage handled. It exports iron ore, wheat, butter and eggs, automobiles, and coal from the rich

agric. and iron-mining regions of the N.W. The Minnesota Steel Co. mills are here. Hydro-electric power contributes to the manuf. of steel and the milling of flour. The city, which is governed by commission, has 442 acs. of parks and 21 m. of scenic drives. Pop. 101,000.

Dulverton, par. and tn. of W. Somersetshire, Eng. 21 m. W. of Taunton. It is a fishing and hunting resort, and is the headquarters of the W. Somerset Yeomanry. Pop. 1500.

Dulwich, suburb of London, in the metropolitan bor. of Camberwell. The D. College, one of the important Eng. public schools, was founded by Edward Alleyn in 1606, and was formally opened in 1619 in the presence of the Lord Chancellor Bacon and numerous other eminent men. In documents signed by Edward Alleyn in 1626, immediately prior to his decease, it was intended that the school should educate eighty boys, twelve of whom were to be poor scholars. The remainder should be the children of D. residents, and 'towne or foreign scholars,' who would pay a fee appointed by the master and wardens. The college now comprises an Upper Dulwich College and a Lower Alleyn's School. There is a valuable collection of pictures which was bequeathed by Sir P. F. Bourgeois, R.A., in 1811. It contains sev. Murillos and valuable pictures from the Dutch school.

Duma, or **Gosudarstvennaya Duma**, the pre-revolution Russian national parliament. It formed the lower house, the upper being the Council of the Empire. It was created in 1905, when Czar Nicholas II. granted his celebrated constitution. The first D., in which a Radical party, known as Constitutional Democrats, preponderated, was opened in 1906, and dissolved in two months. Its members had no experience of parliamentary procedure, and expected at once to carry such drastic reforms as the expropriation of the landlords and universal suffrage. The second was convened on March 5, 1907, and only lived till June 16, 1907. The temper of the House was again highly progressive and socialistic. It clamoured for the abolition of the field courts-martial and refused to be put off with the leisurely reforms proposed by Stolypin, minister of the interior. An excuse for the dissolution was found in the implication of certain Socialist members in what was called a treasonable plot to suborn the army. The third D., which was convoked in Nov. 1907, sat till 1912. This was elected in accordance with an imperial ukase which, contrary to the famous Oct. manifesto of 1905, had tampered with the electoral law in such a way as to secure a majority for the moderate party, known as Octobrists, and the reactionary Right. In its early sessions, however, this parliament paved the way for a class of peasant proprietors by partially sweeping away the communal ownership of land, and also passed measures dictated by a spirit of religious toleration. The mode of election was extremely elaborate, having been carefully designed to give every advantage to the Russian as opposed to the foreign

and subject populations, and also to the wealthy, conservative and property-owning, as opposed to the peasant, democratic and labouring classes. Seven great cities, including St. Petersburg and Moscow, elected direct representatives, but elsewhere the more complex system of electing members, through electoral colleges, was in operation. The Russian revolution in 1917 and the estab. of the Soviet system of gov. under the practical dictatorship of Lenin and Trotsky, brought to a dramatic close the hist. of the Fourth Duma. See also RUSSIAN REVOLUTION.

Dumaguete, cap. tn. of the prov. of Negros Oriental, is. of Negros, Philippine Is., on the Tañon Strait. It lies in a fertile agric. dist., and is an important commercial centre and the seat of the Sillman Institute. Pop. 16,000.

Dumangas, city in the prov. of Iloilo, Panay, Philippine Is. In 1903 it was annexed to Barotac Nuevo. Pop. 12,000.

Dumanjug, tn. in the prov. of Cebu, is. of Cebu, Philippine Is., on the W. coast at the mouth of the D. riv. Pop. 25,000.

Dumas, Alexandre, père (1803-70), celebrated Fr. author, b. at Villers-Cotterets, son of Gen. Dumas, a Creole; lost his father when he was only four years of age and, for a time, led a chequered life, until,



ALEXANDRE DUMAS (PÈRE)

goaded by poverty, he went to Paris to seek his fortune. Later, while serving as a clerk to the Duc d'Orléans, devoted his leisure to play-writing. His success was immediate, for the vaudeville, *La Chasse et l'Amour*, which he wrote in collaboration with two friends, was produced at the Ambigu Comique in the autumn of 1825. Thus encouraged, he composed plays, writing comedy, drama, tragedy, in prose and in verse, with equal facility, until the production of *Madame de Chamblay* in 1868. Some of the plays were good; others were absurdly bombastic; some,

such as *Kean* (1838), frankly (and unconsciously) ridiculous; but whatever their merits or demerits, the author's knowledge of the stage was generally equal to making them successful for the moment. It is, however, unnecessary to devote any space to the consideration of these works, for it is not D. the playwright who is now remembered, but D. the novelist. In fiction his first effort was *Souvenirs d'Anthony* (1835), a collection of short stories, and this was followed by *Isabel de Bavière*, and *Acté* (1839). The most famous of all his books is the *Mousquetaires* series—*Les Trois Mousquetaires* (8 vols., 1841), *Vingt Ans après* (10 vols., 1845), and *Le Vicomte de Bragelonne* (26 vols., 1848-50). The two other prin. series are: (1) *Joseph Balsamo* (1846-48), *Le Collier de la Reine* (1850), *Ange Pitou*, (1853), and *La Comtesse de Charny* (1853-1855); (2) *La Reine Margot* (1845), *La Dame de Monsoreau* (1846), and *Les Quarante-Cinq* (1848). *Le Comte de Monte Cristo* appeared in twelve vols. in 1845. In the novels mentioned, D. is at his best. 'I seem to see myself set on a pedestal which trembles as if it were founded on the sands,' the great man said to his son one day towards the end of his life in a moment of despondency. He need have had no fear as to the foundations on which his reputation rests. 'These sands, your uncounted volumes, are all of gold, and make a foundation more solid than the rock,' wrote Andrew Lang. Thackeray again and again expressed his fervent admiration of his great contemporary. 'All the forenoon I read with intense delight a novel called *Le Vicomte de Bragelonne*,' he wrote to Mrs. Brookfield, 'a continuation of the famous *Mousquetaires*, and just as interesting, keeping one panting from volume to volume, longing for more.' 'D. is wonderful. He is better than Walter Scott,' he said on another occasion. *Les Trois Mousquetaires* is one of the world's masterpieces. Its faults are obvious, but are of little importance in face of the overpowering merits of the book. The weaknesses of exaggeration, bombast, historical blunders are outweighed by the wonderful high spirits, the miraculous adventures, hair-breadth escapes, splendid fights, indomitable courage, never-failing resource of the heroes of Dumas. D'Artagnan, Athos, Porthos, and Aramis, Milady, Chicot, and the rest, have taken their place in the world's literary portrait gallery. D. was epic in his writings. He conceived largely, and executed his conception on the grand scale, and limned his characters with a broad brush. For the rest he let them reveal themselves as the story proceeds, never halting to indulge in psychological studies. Yet these are living human beings, not only the outstanding figures on the vast canvases, but those who occupy minor positions. The inn-keeper is as clearly defined as the cardinal; the captain of the King's Guard no less alive than the executioner of Lille. His very dialogue caught the infection of his scenes, and is as tense and brilliant as the repartee is glittering. It is sometimes asserted

that much of the credit of those wonderful books is due to D.'s collaborators, but to take credit away from Dumas to give to Maquet and the rest is absurd. D. was unhappy in his marriage and wasted all his fortune in gross extravagance. He died at Puy, near Dieppe, broken in health and impaired in intellect, ministered to by his son and daughter. Dumas wrote his own *Mémoires* so far as 1832 (22 vols., (1852-54), but they cannot be regarded as a very trustworthy guide. His complete dramatic works were pub. in 5 vols. in 1874. See lives by B. de Bury, 1885; A. F. Davidson, 1902; J. Lucas-Dubreton, 1928; H. Gorman, *The Incredible Marquis*, 1929.

Dumas, Alexandre, fils. (1821-95), natural son of the novelist, and one of the most distinguished Fr. dramatists of his century, was born at Paris. His whole career presents a strange contrast to that of his father, and the same may be said of his literary productions. His father shows the riotous prodigality and lavish, brilliant fancy of the romanticists, while he himself is Parisian in his minuteness and delicacy of work. He shows, too, after the preliminary period in which he sowed his wild oats, a moral force and earnestness that make his plays almost social sermons. He was early legitimized, and after a course of training at the Institution Goubaux and the Collège Bourbon, he led a wild life for some years, accumulating a vast stock of debts. To pay these off, he seriously took up his father's profession, and his true literary experience begins with the pub. of *La Dame aux Camélias* in 1848. Not only does this novel treat the common romantic theme (as in Victor Hugo's *Marion Delorme*) of the courtesan brought back to virtue by honest love, it also furnishes some autobiographical notes. His succeeding novels, though all readable, are commonplace. The dramatizations of *La Dame aux Camélias* and *Duane de Lys*, played at last in 1852 and 1853 respectively, mark an epoch in his own career and in that of the Fr. stage. Henceforward, though he did not give up the novel, his best work was given to the drama, and his success was great. Almost all his seventeen plays are masterpieces of construction and style. Each of them on its appearance gave rise to lively discussion, which he treats in his celebrated prefaces. In the *Demi-Monde* (1855) he treats the social question arising from the existence in society of this class and he does so with realism and frankness, though his crusade had not much practical effect. He strikes the same note of warning to the youth of France in the plays *L'Ami des Femmes*, *La Princesse Georges*, *L'Étrangère* and other plays; and other reforms in the social or legal sphere are also advocated in *Le Fils Naturel* (1858), and *Un Père Prodigé* (1859). He soon became wealthy and honoured. In 1874 he was made a member of the Institute, and continued his work till his death at Marly-le-Roi, near Paris. He left unfinished *La Troubadour* and *La Route de Thèbes*. Other important plays of his are: *Le*

Demi-monde (1855), *La Question d'argent* (1857), *Les Idées de Madame Aubray* (1867), *Une Visite de noces* (1871), *Jenise* (1885). See life by J. Claretie, 1882.

Dumas, Jean Baptiste André (1800-84), Fr. chemist, b. at Alais, studied chemistry in Geneva, and was carrying on original research before he was twenty-one. In 1823 he migrated to Paris. In 1824 he founded the *Annales des Sciences Naturelles*. As a prof. of his science at the Sorbonne and elsewhere, he always succeeded in gathering round him an eager band of students. Under the Second Empire he served for a time as master of the mint (1868). His idea of substitution (metalepsis), which he supported by proving the similarity in properties between acetic acid and trichloroacetic acid (where chlorine has replaced the original hydrogen), assisted largely in the correction of the atomic theory, whilst he also discovered ingenious methods of ascertaining the amount of nitrogen in organic compounds, and of estimating the density of gases. His works include *Traité de chimie appliqué aux arts* (1828), *Leçons sur la philosophie chimique* (1883), and *Essai de statique chimique des êtres organisés* (1845).

Du Maurier, George Louis Palmella Busson (1834-96), Brit. artist and writer, b. at Paris, was the son of a Fr. *émigré* and an Eng. mother. In 1851 he was studying chemistry at Univ. College, London, and after living in Paris and Antwerp, where he lost the sight of one eye, he settled in London in 1860. His drawings appeared in *Once a Week* and *Cornhill Magazine*, but it is as a *Punch* artist that he lives. In its pages he drew pretty women, spruce nurse-maids, happy children, and proud fathers just as they ought to appear in 'good society.' It was his finished and graceful style which suggested to Mark Lemon the analogy between Du Maurier and the 'romantic tenor.' His novels, including *Trilby* (1894) and *The Martian* (1897) share the charm and wit of his illustration. See T. Armstrong, *Reminiscences of Du Maurier*, 1912; Daphne Du Maurier, *The Du Mauriers*, 1937.

Du Maurier, Sir Gerald (1873-1934), Eng. actor-manager, knighted in 1922, was the younger son of George du Maurier. He made his stage début at the Garrick Theatre, 1891, and was in Barrie's *The Admirable Crichton*, 1902. He was the original Capt. Hook in *Peter Pan*, 1901. Other successes were in *Raffles*, 1906; *Bulldog Drummond*, 1921; *Behold we Live*, 1932. Films: *Escape*, 1931; *I was a Spy*, 1933; *Catherine the Great*, 1934.

Dumbarton, co. tn. of Dumbartonshire, Scotland. It lies on the R. Leven, near its confluence with the Clyde, and is about 14½ m. N.W. of Glasgow. After Clydebank, it is by far the most important ship-building centre in the co., and, besides extensive engineering works, has brass and iron foundries and saw mills. The fortress and castle on the basaltic Rock of D. (240 ft.) is rich in historical interest. William Wallace was confined within its grim walls in 1305, and in 1571 it was cap-

tured, after a brilliant assault, by Crawford, who fought for King James. Formerly the capital of Strathclyde, it was named Dumbreath (fort of the Britons) by the Gaels. Pop. 22,000.

Dumbarton Oaks Conversations, conversations on world organisation between the United Kingdom, U.S.A., Russia and China, at Dumbarton Oaks near Washington, from Aug. 21, to Oct. 7, 1944. The outcome of these talks was agreement on tentative proposals for the estab. of a general international organisation, under the title of The United Nations, which should serve as a basis of discussion at a full United Nations conference. (This conference was held at San Francisco in 1945.) It was also agreed that the Charter of this organisation ('U.N.O.') should provide for the purposes, principles, membership and prin. organs of the organisation. These purposes were, primarily, to maintain international peace and security and to take effective measures for the prevention and removal of threats to the peace and the suppression of acts of aggression or other breaches of the peace, and to bring about by peaceful means settlement of international disputes which might lead to a breach of the peace. These purposes and the principles on which the organisation was to be based, are reproduced in the charter adopted at the San Francisco Conference. Further, it was also agreed at D. O. that the organisation should have a General Assembly, a Security Council, an International Court of Justice and a secretariat - in all of which it resembles the former League of Nations. The Security Council, which is the touchstone of the whole organisation, under the D. O. talks was to consist of one representative of each of eleven members of the organisation. Representatives of the U.S.A., the United Kingdom of Great Britain and N. Ireland, Russia, China and (later) France, were to have permanent seats; while the assembly were to elect six states to fill the non-permanent seats. The charter proposed by the D. O. talks confers on the Council primary responsibility for the maintenance of international peace and security and is to be so organised as to be able to function continuously. In all these particulars it naturally challenged comparison with the ill-fated council of the League of Nations which lacked an international police force to carry out its policies. To strengthen the Security Council in this regard the D. O. talks agreed that if the Council proposes in any given dispute to resort to force it may call on member states to make their contribution to the necessary forces and 'in order that all Members should contribute to the maintenance of peace, they should undertake to make available to the Council on its call and in accordance with special agreements concluded amongst themselves, the necessary armed forces, facilities and assistance.' In order to enable urgent military measures to be taken by the United Nations organisation it was agreed that there should be held immediately available by the Members, national

air force contingents for combined international enforcement action, the strength and degree of readiness of such contingents and plans for their combined action to be determined by the Council with the expert assistance of a Military Staff Committee. For the most part all these bases of agreement for the creation of a United Nations organisation were adopted at the San Francisco Conference (held in June, 1945). See under SAN FRANCISCO CONFERENCE; also UNITED NATIONS, CHARTER OF THE; COVENANT OF THE LEAGUE OF NATIONS. The Dumbarton Oaks talks were pub. as Cmd. 6560 (H.M.S.O.), 1944.

Dumbartonshire, see DUNBARTONSHIRE.

Dumb Cane, or *Dieffenbach Seguire*, species of *Dieffenbachia*. The plant occurs in tropical America, and has an acrid juice, which paralyses the power of speech in one who chews the stem. The natives made use of this in the torturing of slaves.

Dumbness. By the ancients, D. was thought to be, not the natural result of deafness, but the consequence of some brain trouble, or incapacity of the vocal organs, and by some was imagined to be possession by an evil spirit. Pedro Ponce de Leon (1520-84), a Spaniard, was the first instructor of the deaf and dumb, teaching many of them to speak, read, and write. There are three prin. methods in the instruction of the deaf and dumb: the oral, the sign and manual, and the combined method. The oral method instructs by and through speech; the pupils learn to pronounce the elemental sounds of the language, and to read from the lips. The second method is by a language of signs, and the third combines speech, lip-reading, writing, and signs. See also DEAF AND DUMB.

Dum-Dum, or **Dam-Dam**, tn. of India, in the presidency of Bengal, and the dist. of the Twenty-four Parganas, 6 m. from Fort William. For several years, until 1853, it was the headquarters of the Bengal artillery, and it was regarded as the 'Woolwich' of India. The soft-nosed expanding bullets known as Dum Dum were first manuf. here. The tn. is noted for the fact that the mutiny of 1857 originated here.

Dumfries, co tn. of Dumfries-shire, Scotland. It lies on the Nith, 8½ m. from its mouth in Solway Firth, and is connected by three bridges with Maxwelltown, its suburb, which, as it is situated on the r. b., belongs to Kirkcudbrightshire. The first bridge, now only a footbridge, over the Nith, opening a way to the W., was built in 1283. The tn. is engaged in the manuf. of tweeds and hosiery and has an important cattle mkt. Robert Burns, who lived here from 1791 till his death (1796), lies buried in St. Michael's Church (1746), and the site of the Franciscan monastery, where Robert Bruce slew the Red Comyn, is now partly covered by the Gothic Greyfriars Church (1867). At the County and Commercial hotel is a room in which Prince Charlie held a levée and which has remained almost unchanged since his day. The Mid-Steeple in High Street, once a

court-house, is the place at which Effie Deans was tried. There are memorials to Burns, Carlyle, and Sir Walter Scott at The Hole in the Wall. Nearby is a statue of Henry Duncan, the founder of savings banks; just beyond it lies the original garden of *Peter Pan*; J. M. Barrie was educated at the Academy here and took the garden as his model. Burns's house in Mill St., is now the property of the tn. council. At the Globe Inn, where he foregathered with his cronies, his chair and other belongings may still be seen. The old theatre of 1790, where Macready had his first success is now a cinema. The stately Caerlaverock Castle, to which Edward I. laid siege in 1300, is 8 m. from D. and is still in excellent preservation. Near D. is Sweetheart Abbey, whose last abbot, Gilbert Bruce, is believed to have been the original for Scott's *The Abbot*. The abbey was founded in 1273 by Devorguilla, wife of John de Baliol. It was here in 1300 that Edward I. received the Papal Bull that ordered him to cease the oppression of Scotland; he defied the Pope, thus beginning the breach that culminated under Henry VIII. Pop. 22,000.

Dumfriesshire, border co. of Scotland, bounded on the N. by the cos. of Lanark, Peebles, and Selkirk; on the E. by Roxburghshire; on the S. and S.E. by the Solway Firth and Cumberland; and on the W. by the cos. of Ayr and Kirkcudbright. The chief highlands, including White Coomb (2695 ft.) and the Lowther Hills (2377 ft.), lie N. The valleys of the three main rivs., the Nith, the Annan, and the Esk, all of which empty into the Solway, separate the N. of the shire from the S. Railways ascend Nithsdale, Annandale, and Eskdale, as far as Langholm. Loch Skene (1750 ft. above sea-level) in the N. gives rise to the beautiful waterfall called Grey Mare's Tail. The rural pop. is engaged in cattle and sheep rearing, and apart from Dumfries, Annan (pop. 6300), Langholm, and Lockerbie are the only tns. of importance. Area 1072 sq. m.; pop. 81,000.

Dümichen, Johannes (1833-94), Ger. Egyptologist. His series of learned works on Egypt, including *Geographische Inschriften altägyptischer Denkmäler* (1865-85), was the fruits of extensive travel and original research, especially into inscriptions.

Dumnonii, see DAMNONII.

Dumont, Alberto Santos, see SANTOS DUMONT.

Dumont, François (1688-1726), Fr. sculptor, b. in Paris and d. at Lille. He studied under his father, and first gained distinction with a figure of David, and of a Titan. Afterwards executed a number of monuments and works for churches. Died as the result of a fall while erecting the tomb of the duke of Melun. His son Edmé executed the well-known statue of Milton of Crotona testing his strength, which is in the Louvre.

Dumont, François (1751-1851), Fr. miniature-painter. Executed portraits of Louis XVI. and his queen, and Charles X. Many of his best works are in the Louvre.

Dumont, Pierre Etienne Louis (1759-1829), Fr. political writer. His *Souvenirs sur Mirabeau* (1832), are of peculiar interest, both because the author was a personal friend of the Fr. statesman—he is said to have composed some of Mirabeau's speeches—and because they give the impression which the Great Revolution made upon a discerning eye-witness. D. was instrumental in restoring freedom to his native city, Geneva, and has earned the gratitude of posterity for his able editorship of the *Traité de Legislation* and other works of Jeremy Bentham, the jurist. See J. Martin, *Etienne Dumont*, 1759-1829, 1912.

Dumont d'Urville, Jules Sebastian César (1790-1812), Fr. navigator, b. at Condé-sur-Noireau, was an accomplished linguist and student of entomology and botany. It was he who discovered and recognised the priceless Venus of Melos (Milo). The find occurred during a hydrographic survey of the Mediterranean in 1820. In 1830 he was in charge of the ship which took Charles X. to England. In 1838 he sailed for the Antarctic and discovered Joinville Island, Louis Philippe Land, and later (1810) Adélie Land. An is. off New Guinea, which he visited during his second voyage of circumnavigation (1826-29), bears his name, D'Urville.

Dumouriez, Charles François (1739-1823), celebrated Fr. general, was b. at Cambrai. In 1757 he entered the Fr.



GENERAL DUMOURIEZ

army and fought under his father, a commissary royal, during the Seven Years' War. He was afterwards sent as an envoy to Poland and Sweden, but while engaged in the latter country he fell into disgrace, and, being recalled, was imprisoned in the Bastille. On the succession of Louis XVI. he was released, and was soon made commandant of Cherbourg, where he did much to improve the naval administration. On the outbreak of the revolution, he took the popular side, ultimately becoming connected with the

Glondins, by whose influence he was made minister of foreign affairs. He resigned this post to receive command of the army in the N., and carried on a successful campaign against the duke of Brunswick. It was by his exertions that the latter was defeated at the battle of Valmy, and Franco was saved from the dangers of invasion. Later in the same year he pressed into the Austrian Netherlands and won the victory of Jemappes. In 1793 his career of conquest came to an end. He had attempted to make arrangements for the restoration of the monarchy, and he was charged with treason. Four commissioners were sent to arrest him, but he captured them and took refuge with the Austrians. He was not able to remain here long, and wandered throughout Europe with a price on his head, settling finally in England, where he died at Great Marlow. Of his numerous pubs, the most important is his *Mémoires* (1796).

Dumping. In its restricted business meaning *D.* refers to the method of disposing of superfluous stock at a low price in some place where its sale shall not affect the regular business. But in its wider economic meaning it denotes the export sale of a commodity at a price lower than that in the domestic market. A practice since the sixteenth century, it became prominent in the nineteenth. In the past forty years or more large cartels or trusts of sev. major manuf. countries pursued a policy of securing the export trade at dumping prices to kill competition. Among the most fruitful causes of discussion as to what constitutes *D.* between the two World Wars were: (1) The heavy selling of goods by Germany during her periods of inflation, which was a natural consequence of the rush of the Ger. people for more stable money than their own marks; (2) the return of Russia to international trading, with consequent heavy selling of oil and flour in Brit. home mktks.; (3) the more trivial but spectacular selling of Amer. superfluous magazines and pubs. in this country; (4) the selling of cheaply produced Jap. textiles and other goods in world markets, particularly from 1933. The introduction by the Brit. Gov. of a quota system for textile imports into the Brit. colonies offset this last phase of *D.* Laws imposing additional duties on dumped goods were passed in Canada (1900), in the Union of S. Africa (1911), and in 1921, in U.S.A., Great Britain, Australia and New Zealand. See J. Viner, *Dumping, A Problem in International Trade*, 1923.

Dumraon, tn., 6½ m. W. of Patna, dist. of Sháhábád, W. Bengal, India. Pop. 19,000.

Dun, Celtic and Teutonic root, meaning 'hill', and connected with the Anglo-Saxon *tun*, from which 'town' is derived. Cf. also Eng. 'dowus' and Fr. *dunes*. Various forms of it occur in place names like *Donegal*, *Dunedin*, and *Dumfries*. In early times the word was used in Ireland and Scotland of forts with ramparts. Such 'duns' are found at Duncricht and Tap o' Noth in Aberdeenshire, and in many Irish villages.

Duna, Hungarian name for the R. Danube.

Dünaburg, see DAUGAVPILS.

Duna-Földvár, tn., 33½ m. S.E. of Stuhlweissenburg, on the r. b. of the Danube, Hungary, with mills, tiles, pottery, hemp, and food industries. Pop. 12,000.

Dunajec-San, Battles of. The Rs. Dunajec and San both run N. from the Carpathians in Galicia. During the First World War their direction, and the fact that Tarnow is situated on the former and Przemyśl on the latter, brought them into prominence. In their advance the Russians swept over these areas in Sept. 1914, and reached Tarnow. The fact that the Russians had been reinforcing their Carpathian front at the expense of the Tarnow area decided the Central Powers to attempt a break-through at that place, which, had it succeeded, would have 'rolled up' the Russian forces on the Carpathians (q.v.). The Gers. withdrew a number of divs. from the W. front, and these, together with an Austro-Hungarian force, the whole under the command of Gen. von Mackensen, were concentrated in Galicia for the operation. The attack opened on May 2, 1915, and, owing to the intense preparatory bombardment, the Russians gave way almost everywhere, and the lower Dunajec was crossed during the same day. Great pressure was brought systematically against various parts of the sector, and although the Russians withstood it bravely, the tactical combinations of their opponents were too much for them. Tarnow, in fact, was not evacuated until May 5, and only after a desperate struggle. The Russians were attacked again on May 8, and by the night of May 12 the Central Powers were threatening their positions on the San, particularly Przemyśl. By May 21 the struggle for the fortress had begun, and although a powerful counter-attack was launched by the Russians, it failed, and by the first week of June they were forced back from the San.

Dunant, Jean Henri (1828-1910) Swiss philanthropist. See under RED CROSS.

Dunbar, fishing port of E. Lothian, Scotland. It is 29½ m. E.N.E. of Edinburgh by rail, and has two harbours, both fairly accessible, at the entrance of the nrth of Forth. The castle and Grey Friars monastery, which dates back to 1218, are both picturesque ruins. The former was captured by Edward I. (1296), and offered refuge to Edward II. after Bannockburn (1314), to the unfortunate duke of Albany (1479), and twice to Mary, Queen of Scots. The golf links and the slight rainfall attract many visitors in summer-time, and close by is the scene of the battle of Dunbar (1650). Pop. 4000.

Dunbar, Earls of: *Cospatrik* was created first earl of Dunbar by his kinsman, Malcolm III., and in 1072 received from him the grant of the tn. of Dunbar with the surrounding lands of Lothian.

Patrick (1284-1368), tenth earl, sheltered Edward II. in 1314 after the battle of Bannockburn at Dunbar Castle. He married 'Black Agnes' the sister of the

Randolph who led the centre of the Scottish forces at that battle. 'Black Agnes' herself is famous for her defence of Dunbar Castle against the Eng. under Salisbury in 1337, when she successfully held the castle for five months.

George, the eleventh earl, was deprived of his title and estates by James I. of Scotland in 1431. In 1605 the title was revived in favour of George, third son of Alexander Home of Manderston, who took a leading part in the re-estab. of episcopacy in Scotland.

Dunbar, William (c. 1460–c. 1520), greatest of the old Scottish poets, is generally supposed to have been born in E. Lothian and educated at St. Andrews. Practically nothing is known of his early life, and little of his later. He early entered the order of the Friars Minor (Franciscan), but gave this up in disgust. Thereafter he appears to have been employed by James IV. in some court and political business. His chief poems are *The Thrissil and the Rois* (The Thistle and the Rose), in which he celebrates James's marriage with Margaret Tudor (1503); *The Dance of the Seven Deadly Synnis*, an allegory (before 1508); *The Golden Targe* (1508), another allegory, and various lyrics, of which the most notable is (c. 1507) *The Lament for the Makaris* (poets of Scotland and England). In all these there is true poetry. In his allegorical poems, D. follows Chaucer in his setting, and is thus more or less imitative and conventional; in his satirical pieces and lyrics he takes a bolder flight and shows his native power. His comic poems are somewhat gross. The date and circumstances of his death are uncertain, some holding that he fell at Flodden, others that he was alive so late as 1530. Other works are *The Merle* and *The Nightingale*, and the *Fliiting* of D. and Kennedy. D. is described by Sir E. Gosse as 'the largest figure in Eng. literature between Chaucer and Spenser.' He has strength, swiftness, humour, and pathos, and his descriptive touch is vivid and full of colour. See J. Paterson, *Life and Poems of Dunbar*, 1880; J. Schipper, *William Dunbar. Sein Leben und Gedichte*, 1884; C. Steinberger, *Étude sur William Dunbar* 1908; R. A. Taylor, *Dunbar*, 1932.

Dunbartonshire, co. of Scotland, bounded on the N., E., and S.E. respectively by the shires of Perth, Stirling and Lanark, on the S. by the Clyde, and on the W. by Loch Long, a beautiful salt-water inlet, and Argyllshire; there is also an enclave of the co. to the E., bounded on the N. by Stirlingshire and on the S. by Lanarkshire. Ben Vorlich (3092 ft.) and Ben Vane (3004 ft.), and at least ten peaks over 2000 ft. high, crown the highlands in the W. and N.W., whilst in the S. rise the Kilpatrick Hills. The chief rvs. are the Clyde, with its affluent, the Leven, and the Kelvin; the prin. glens of the hilly regions, Glens Sloy, Douglas, Luss, and Fruin are named after the streams which water their beds. The splendid scenery of Loch Lomond attracts many visitors each year, and Garelochhead, at the N. end of the Gareloch, is also a favourite

tourist centre. The neighbourhood of so large a mkt. as Glasgow has led to the estab. of large dairy farms, and the successful adoption of highly intensive cultivation. Clydebank (14,100 inhabs.) and the co. tn. Dumbarton (22,500) are busily engaged in shipbuilding, and Alexandria (10,300), Renton, and Bonhill in bleaching, Turkey-red dyeing, and printing cottons and other fabrics. Coal is mined in Kirkintilloch (13,800). Pop. 156,100.

Dunblane, mkt. tn., on Allan Water 14 m. S.S.W. of Crieff, in W. Perthshire, Scotland. Woollen goods are manuf., but the chief interest of the tn. is historic. The cathedral, which was rebuilt in 1210 by Bishop Clemens, is in the Early Pointed style, with a fine W. window. An account of St. Blaen and of the early foundation of the Sec of D. may be found in the works of Dowden, and A. O. Anderson. D. was an important place in the Middle Ages, being not only the seat of an old diocese, but, lying near Stirling, where Eng. Kings often resided, it played no small part in our national hist. See A. B. Barty, *The History of Dunblane*, 1945.

Duncan I. (d. 1040), King of Scotland succeeded his grandfather (on his mother's side) Malcolm II. in 1031. He was regarded as an usurper by many of his subjects and his right to kingship contested, notably by Macbeth, who killed him in 1010.

Duncan II (d. 1094), King of Scotland, son of Malcolm Canmore, whom he succeeded in 1093, being supported in his claim to the throne by England against his rivals Edmund and Donald Bane. Killed in battle, 1094.

Duncan of Camperdown, Adam, first Viscount (1731–1804), Brit. admiral, b. at Lunzie in the co. of Angus, Scotland. He received his earliest education at Dundee, and in 1746 was placed under Capt. Haldane in the frigate *Shorcham*. Assisted in the attack on Gorra, a Fr. settlement in W. Africa. In 1795 he hoisted his flag as commander-in-chief of the North Sea, and began harassing the Dutch. On Oct. 11, 1797, he gained a decisive victory over the Dutch, and in recognition of his services he was created Viscount Duncan of Camperdown and Baron of Lunzie, and also was granted a pension of £3000 to himself and two next heirs to the title.

Duncan, Andrew, the Elder (1744–1828), Scottish physician, b. at Pinkerton, near St. Andrews. From 1774–76 he lectured on medicine at the univ. of Edinburgh. In 1790 he was appointed president of the Edinburgh College of Physicians and prof. of Physiology. In 1776 he founded a public dispensary, and in 1807 a lunatic asylum at Morningside, Edinburgh. His chief writings were *Medical and Philosophical Commentaries*, a quarterly jour. of medicine (1773–95), continued as *Annals of Medicine* until 1804, when his son took over the work of editor and issued the *Edinburgh Medical and Surgical Journal*. He also wrote sev. medical treatises. There is an autobiographical fragment in his *Miscellaneous Poems* by A. D. (1818).

Duncan, Andrew, the Younger (1773-1832), Scottish physician, son of the preceding, *b.* at Edinburgh. In 1807 he was appointed first prof. of medical jurisprudence in Edinburgh. From 1819-21 he was joint prof. of physiology with his father, and from 1821-32 he was prof. of *materia medica*. His chief literary work was for the *Edinburgh Medical and Surgical Journal* and an improved version of Lewis' *Edinburgh New Dispensary* (1803).

Duncan, Henry (1774-1846), founder of savings banks, *b.* at Lochrutton, Kircudbrightshire, Scotland. He was intended for a commercial life, but left it for the church, and in 1798 was ordained minister of Ruthwell in Dumfriesshire. He was remarkable for the breadth of his views and the diversity of his interests. He was captain of a company of volunteers, an ardent antiquarian and geologist, the pub. of a popular series of tracts entitled *The Cottage Fireside*, the editor of *The Dumfries and Galloway Courier*, and the author of *The Sacred Philosophy of the Seasons* (1836). His most important labours were connected with the estab. of savings banks, the first being instituted at Ruthwell in 1810, and later, through his efforts, all over the country. See life by his son, 1848.

Duncan, Isadora (1878-1927), Amer. dancer and pioneer in the revival of Gk. classical poses and barefoot dances with flowing draperies; *b.* in San Francisco, she had appeared on the New York stage before emigrating with her family to England. In 1901 she appeared in Paris, and at the Théâtre Sarah-Bernhardt in 1903. She won a reputation by her 'interpretations' of music by means of dancing. Her life was, however, marred by tragedy; in 1913 her two children, with their nurse, were drowned in the Seine at Neuilly as the result of a motor accident; in 1921 she married the young Russian poet Serge Yessenin, whom she divorced two years later; and in 1927 she herself was strangled by her own scarf while motoring. Her memoirs, *My Life*, were pub. in 1927. See P. Magriel (ed.) *Isadora Duncan*, 1948.

Duncan, Robert Kennedy (1868-1914), Amer. chemist; *b.* at Brantford, Ontario, Canada. Prof. of Chemistry at Washington and Jefferson College, 1901-6. From 1906 he was prof. of Industrial Chemistry at the Univ. of Kansas; and from 1910 director of industrial research - taking, at the same time, the same positions in Pittsburgh Univ. He discovered and patented a new process for manuf. phosphorus; a new low-melting glass; and processes for decorating glass. Initiated in 1907, at Univ. of Kansas, a scheme of industrial fellowships, which has since grown to remarkable proportions there and at Pittsburgh. Pub.: *The New Knowledge* (1905), *The Chemistry of Commerce* (1907), *Some Chemical Problems of To-Day* (1911).

Duncan, Thomas (1807-45), Scottish painter, *b.* at Kinclaven, Perthshire. He began to exhibit at the Scottish Academy in 1828, and won so great a reputation that in 1830 he was elected a member of

the Royal Scottish Academy and in 1843 an associate of the Royal Academy, London. His prin. pictures represent scenes from Scottish hist., and are remarkable alike for their skill in colouring and for the faithful portraiture of Scottish character. There are fine specimens of his work in the National Gallery of Scotland, including portraits of himself, Lady Stuart of Allanbank, and Lord Colonsay. His illustrations from literature include 'Jeanie Deans on her Journey to London' (1831) and 'The Woeful Heart' (1841), from *Auld Robin Gray*. His chief historical pictures are: 'Prince Charles Edward entering Edinburgh' (1840), 'Prince Charlie Asleep after Culloden' (1843), 'The Martyrdom of John Brown of Priesthill, 1685' (1844), now at Glasgow.

Duncan de Cérésantis, Mark (d. 1648), writer of Lat. verse. He entered the service of Sweden, and was Swedish ambas. to France in 1645, but renounced his position and his Protestantism and went to Rome. In 1647 he met the Duc de Guise, and accompanied him to Naples as secretary. He died of a wound received in an engagement with the Spaniards while aiding Guise in his attempt to take Sicily from Spain. His fame as a Lat. versifier was great; the most celebrated of his poems being the *Carmen Gratulatorium*, on the marriage of Charles I. of England and Henrietta Maria.

Duncansby Head, promontory (210 ft.) forming the N.E. extremity of Caithness, Scotland, 184 m. N. of Wick and 14 E. of John o' Groat's house.

Dunciad, The, celebrated satire pub. in 1728 in three books, to which a fourth was added in 1742, in which Alexander Pope takes revenge for the hostility of his critics by holding them up to ridicule as members of the court of Dullness.

Duncker, Maximilian Wolfgang (1811-1886), Ger. historian. In 1837 he accepted the post of prof. of hist. at Tübingen, but was recalled to Berlin in 1859, becoming counsellor to the crown prince in 1861, and director of the state archives from 1867 to 1874. His high place among Ger. historians exists chiefly on his *Geschichte des Alterthums*, 1852-57, Eng. trans. by E. Abbott, 1877-82. He also pub. *Origines Germanicæ* (1810), *Die Krisis der Reformation* (1845), *Zur Geschichte der Deutschen Reichsversammlung* (1849), and *Feudalismus und Aristokratie* (1858).

Dundalk (Gaelic, *Dun Dealgan*), cap. of co. Louth. It is situated on the R. Castletown, near its entrance into D. Bay, 12 m. S.W. of Newry. It is a railway centre for the Great N. railway, and there are important works belonging to the railway. There is also in normal times a daily service of steamers to Liverpool. A considerable trade in dairy and agric. produce and live stock is carried on; there are also mills for flax-spinning, breweries, and distilleries. The fisheries are important, especially the salmon-fishing industry. Pop. 14,700.

Dundas, In. of Wentworth co., Ontario, Canada, at the head of Burlington Bay, Lake Ontario. It has large mills worked

by water, and manufs. leather, paper, flour, machinery, and tools and textiles. Pop. 5000.

Dundas, group of about 500 coral is. (also called Juba Is.), off the E. coast of Africa, in lat. 1° S. They possess only one safe harbour.

Dundas, baronial castle, 1½ m. S.W. of Queensferry on the S. bank of the firth of Forth, Scotland. It dates from the eleventh century, and was the seat of the family of Dundas until 1875.

Dundas, Sir David (1735-1820), Brit. general and writer on tactics, b. in Edinburgh. He entered the army in 1752, and was aide-de-camp to Gen. Elliott in 1760-1, in the campaigns in Germany. Every year he was present at the manoeuvres of the Fr., Prussian, and Austrian armies, and in 1788 pub. the results of his observations of their tactics in *The Principles of Military Movements, chiefly applicable to Infantry*. His *Rules and Regulations for the Formation, Field Exercises, and Movements of his Majesty's Forces* (1792) were pub. as the official orders for the army, and were followed by *Rules and Regulations for the Cavalry* (1792). It was under these rules and regulations that the battles of Moore and Wellington were fought. He was made governor of Chelsea Hospital in 1804, and commander-in-chief of the army from 1809-11.

Dundas, Henry, first Viscount Melville (1712-1811), member of a distinguished legal family, was educated at Edinburgh Univ. At the age of twenty-four he was appointed solicitor-general for Scotland. In 1774 he became a member of parliament, and in the next year was made lord-advocate. He was a regular attendant at Westminster, where he vigorously opposed any concession being made to the Amer. colonies while they were in arms against the mother country, and in 1778 he supported a motion for the repeal of the Massachusetts charter. His advance was as rapid as it was steady. Later he was home secretary in Pitt's administration, and in 1794 secretary for war, with William Windham as secretary-at-war. He was in 1802 created Viscount Melville, and two years after returned to office with Pitt as first lord of the admiralty. Charged with malversation in 1806, he was impeached, but acquitted on all charges, and his name, which had been struck off the roll of privy councillors, was restored. He never again held office, and in 1809 declined the earldom that Percival offered him. An able man, and a ready speaker, he stands in the political hist. of his times as the intimate and trusted adviser of William Pitt.

Dundas, Sir Lawrence John Lumley, see ZETLAND, MARQUESS OF.

Dundee, city, a royal parl. and municipal burgh and seaport in the co. of Angus, Scotland, situated on the N. shore of the firth of Tay. The tn. which is Scotland's fourth largest city, stands on a gentle slope, rising from the water's edge to the hill known as the Law (571 ft.). The estuary opposite the tn. is nearly 2 m. wide, and its shipping is important

enough to make it the second port of Scotland. The tn. is well built, and underwent much improvement in the course of the last century. It possesses many fine buildings, among which are the City Square buildings, and the Albert Institute, which includes a free library, museum, etc. This institute, in fifteenth century Gothic, was designed by Sir Gilbert Scott. Other important edifices are the Royal Exchange, St. Paul's Church, Univ. College (St. Andrew's Univ.), Caird Hall, and the Technical Institute. There are sev. fine parks, chief of which are Camperdown Park of approximately 150 ac.; the Baxter Park; and Balcay Park on the hill of Balcay. The chief industry of Dundee consists in the manuf. of jute and heavy linen fabrics such as sailcloth. There are also manufs. of cordage, fine linen, confectionery, marmalade, cash registers and accounting machines, watches, plastics, etc. Some shipbuilding is carried on, and mill-wright work, and there are marine and other engine works wherein textile machinery, steam boilers and engines, etc. are manuf. There are also extensive sawmills. There are thirteen trade guilds, and about 100 spinning mills and factories. Dundee is the chief centre of the jute trade. It was once strongly fortified, and suffered greatly from war at various times. On account of the prominent part taken by its citizens in forwarding the work of the Reformation, it is often given the title of 'The Scottish Geneva.' On Dec. 28, 1879, part of the Tay Bridge (which connects D. with Fifeshire) and the train passing over it were blown into the river, with the loss of over seventy lives. The tn. of Broughty Ferry is included in the burgh of D. Pop. 175,500. See J. Thomson (continued by J. MacLaron), *The History of Dundee, 1874*. A. Maxwell, *Old Dundee: ecclesiastical, burghal and social, prior to the Reformation*, 1891; A. C. Lamb, *Dundee, its quaint and historic buildings*, 1895; Brit. Association, *A Scientific Survey of Dundee and District*, 1939.

Dundee, John Graham of Claverhouse, Viscount (c. 1649-89), Scottish soldier. He served as a volunteer in the Fr. army and in the Dutch army under the Prince of Orange, where he obtained a cornetcy in 1674 for saving the life of the prince at the battle of Seneffe. In 1677 he returned to England and obtained a captaincy in the regiment of the marquis of Montrose, charged with enforcing the penal laws against the Scottish Covenanters. Graham's attempt to disperse an armed force of Covenanters at Drumclog ended in his defeat, and was the signal for a serious and general rising. He was more successful at Bothwell Bridge (1679), and afterwards made a tour through the S.W. cos. in search of rebels, routing a company at Aird's Moss and killing the leader, Cameron. In 1682-84 he suppressed the Covenanters of Dundries, Annandale, Kirkeudbright, Ayr, and Lanark with the severity enjoined by the gov. killing, robbing, and starving them when they would not submit. In 1688 he was appointed second in command of the Scottish army,

and was ordered S. with his forces to protect the Stuart throne and oppose the landing of William of Orange. In the same year James II. created him Viscount Dundee. After James II.'s flight to France D. returned to Scotland and was indefatigable in supporting the Stuart cause. In July 1689 he organised a rising in the Highlands, and completely routed the forces of Mackay, but was killed in the moment of victory at Killiecrankie. See M. Napier, *Memorials and Letters of Graham of Claverhouse*, 1859-62; C. S. Terry, *John Graham of Claverhouse*, 1905; and I. MacLaren's *Graham of Claverhouse*, 1908; and Scott's *Old Mortality*, and *Redgauntlet*.

Dundonald, tn. In the par. of D., Ayrshire, Scotland. D. Castle, erected in the twelfth century, where Robert II., the first Stewart sovereign, died in 1390, and Old Auchans Castle, are ruins. Pop. 1600.

Dundonald, Earls of, see COCHRANE, DOUGLAS MACKINNON BAILLIE HAMILTON and THOMAS.

Dundrennan, vil. In the par. of Rerwick, co. of Kirkcubright, Scotland. 5 m. S.E. of Kirkcubright, with the ruins of an anct. Cistercian abbey (1142).

Dune, mound or ridge of loose sand heaped up by the wind on the seashore or occasionally on the shore of an inland lake and on the banks of a riv. The name is also used for the wide stretches of sand in an inland dist. of low rainfall. Among the minerals which occur among sand deposits, quartz is by far the most common and of the longest duration, as it is comparatively hard, has practically no cleavage, is insoluble in water, and does not readily decompose, while the other grains decompose comparatively rapidly. In general, the sand grains which form the Ds. are rounded, due to mutual attrition during transport; the greater the distance travelled the smoother and rounder the grains. The wind which heaps up the Ds. seldom carries even the smallest grains in suspension, but rolls them along the ground, sometimes with a movement as smooth as flowing liquid, and sometimes with a skipping motion.

A D. has a gentle windward slope and a steep leeward descent; the rolling grains being driven up a gentle incline and falling steeply into the hollow below. Moving sands are in many places altering the surface of the land; the continuous blowing of a steady wind in one direction frequently covering fertile tracts with this arid deposit, moving at the rate of from 60 to 70 ft. in one year. The average height of coastal sand Ds. is from 200 to 300 ft., but in the crescent-shaped sand Ds. of the Sahara they sometimes rise to a height of 600 ft. in a wide belt of sand called 'Iridi' or 'Gidi,' from the Berber word for Ds., and are separated by depressions, sometimes below sea-level, called 'Juf.' Little can be done to arrest the progress of moving sand Ds., but they can be fixed to a certain extent by planting *Carex arenaria*, and similar plants with long creeping roots. Particular attention is given to this form of

conservation in the Netherlands, because at some points on the Dutch coast the sand Ds. form the only protection for inland dists. against the sea, which is often at a higher level than the land. See H. Schirmer, *Le Sahara*, 1893; W. H. Wheeler, *The Sea Coast*, 1902; E. R. Matthews, *Coast Erosion and Protection*, 1934.

Dunedin, cap. of the dist. of Otago, is the fourth largest city in New Zealand, situated at the head of the Otago Harbour 15 m. from the sea. The harbour is accessible to vessels drawing 25 ft. right up to Dunedin, while Port Chalmers, 9 m. N.E. by rail, handles the shipping drawing over 25 ft. up to 30 ft. 6 in. Spread over seven hills, Dunedin has a beautiful setting, and has preserved much of the native forest in laying out the Town Belt and Public Gardens. Dunedin is often referred to as the 'Edinburgh of the South,' and is regarded as the most Scottish City outside Scotland. Scottish tradition is well preserved there. Dunedin is essentially an education centre, the Univ. of Otago catering for students of arts and science, medicine, law, dentistry, home science, physical education, commerce and mining. In addition there is a teachers' training college and many secondary schools and colleges (Public and Private). The city has a number of fine buildings, notably, the post office, tn. hall, First Church, Knox Church, Univ. of Otago, and the Otago Boys' High School. Local industry covers a wide field for in and around Dunedin are found woollen mills and clothing factories, engineering works, agric. implement makers, gas and electric range factories, soap works, lime and cement works, a rope and twine factory, printing works, iron foundries, paper mills, aerated water and cordials manufacturing plants, fertilisers and allied products manufacturers, boot and shoe works, the only iron rolling mills in the Dominion, the manuf. of wax matches, tanning and fellmongering, sawmilling, ink-making, production of hardware and woodware for building purposes, canning and preserving works, butter and cheese making, wax paper manuf., basket manufacturing, flour mills, and a linseed oil factory. Shipbuilding, one of the oldest industries, is now being revived, together with its associated trades, such as the overhauling and repairing of ships. 1948 marked Dunedin's centenary and many important events were held to celebrate the occasion. Pop. 88,800. (See illustration, p. 41.)

Dunedin and Stenton, Andrew Graham Murray, first Viscount and Baron (1849-1912), Scottish lawyer and statesman, b. at Edinburgh, Nov. 21. son of Thos. Graham Murray, of Stenton, Fordie, and Locholly, Perthshire, writer to the signet and sheriff of Aberdeen. Educated at Harrow and Trinity College, Cambridge. He was called to the Scottish Bar in 1874, sheriff of Perthshire, 1890-1; Solicitor-General for Scotland, 1891-2, 1895-6; Lord-Advocate of Scotland, 1896-1903; Secretary for Scotland, 1903-5; Lord Justice General and Lord President of the

Court of Session, Scotland, 1905-13. Since then lord of appeal in ordinary. Conservative M.P. for Ruteshire, 1891-1905; raised to the peerage in 1905; viscount, 1926. Appointed to War Compensation Royal Commission, Aug. 1915; Chairman, Royal Commission on Honours, Aug. 1922; Member of judicial committee of privy council on Irish boundary, July 1924. Resigned his office as a lord of appeal in 1932.

Dunfermline (Gaelic, the fort on the crooked linn), tn. 3 m. from firth of Forth

being called to the Scottish Bar in 1577. He became judge in 1593, Lord President of the Court of Session in 1598, Baron Fyvie in 1597, and chancellor in 1640-8. He was appointed guardian of Prince Charles, afterwards Charles I., and helped to arrange the union between England and Scotland. He was created earl of Dunfermline in 1606.

Dungannon, tn. of N. Ireland in the co. of Tyrone, 10 m. S.W. of Cookstown. It was the home of the O'Neills, kings of Ulster. There are manufs. of linen goods,



High Commissioner for New Zealand

DUNEDIN: THE OCTAGON, WITH ST. PAUL'S ANGLICAN CATHEDRAL AND THE TOWN HALL

and 16 m. N.W. of Edinburgh, in Fife-shire, Scotland. Since 1718 the tn. has been busily engaged in the linen industry, especially damasks, and it now has dye and bleach works, iron foundries and distilleries. The fine Norman nave, which is all that the Reformers spared in their assault on the abbey (1560), now forms the vestibule of the New Abbey Church. Malcolm Canmore and Margaret, who were married in D. (1079), were buried in the abbey, which for over two centuries afterwards was the recognised place of royal sepulture. St. Margaret, whose tomb may still be seen, Ralph Erskine, and Sir Noel Paton, are some of D.'s worthies, but of all her sons, her greatest benefactor was Andrew Carnegie, who presented the tn. with Pittencrieff Park and Glen, and a free library, besides an ann. income of £25,000. Pop. 40,000.

Dunfermline, Sir Alexander Seton, first Earl of (c. 1555-1622), Scottish statesman. He studied at the Jesuit College, Rome, but gave up this proposed admittance to the priesthood, and studied law in France,

earthenware firebricks, and tiles, also a trade in corn and flax. Pop. 4000.

Dungarpur, state of Rajputana, Central India, with a cap. of the same name. Area 1447 sq. m.; pop. 190,000. Cap. pop. 7500.

Dungarvan, urban dist. and seaport tn. of Eire, in co. Waterford. It is situated on the bay of D. There are fisheries and a trade in dairy and agric. produce. The legend runs that the tn. was spared by Cromwell because a woman drank his health at the gateway. Pop. 5200.

Dungeness: (1) Low headland on the S. coast of Kent, England, 10½ m. S.E. of Rye, with a lighthouse, coastguard station, and a small fort. Lloyd's signalling station is near. (2) Port at the entrance to the Hitchenbrook Channel, Cardwell co., Queensland, Australia, 60 m. N.W. of Townsville.

Dungeon, or Donjon (Lato Lat. *domnio*, from *dominus*, a lord), the prin. tower or the keep (*q.v.*) of a Norman castle. The modern use of the word 'dungeon' for a prison is derived from the position

of the Norman prison in the ground story of the 'donjon'.

Dungiven, mkt. tn. in the co. of Londonderry, N. Ireland. Near it are the remains of an Augustinian priory founded in 1100. The quartz crystals known as Dungiven diamonds are found near here. Pop. 700.

Dunglas, promontory on the R. Clyde, Scotland, 2½ m. E.S.E. of Dumbarton. It is a rocky headland, supposed to have been the site of a Rom. station, and the end of the wall of Antoninus. It has ruins of the castle of the Colquhouns of Iuss, and a monument to Henry Bell (1767-1830), the pioneer of steam navigation in Britain.

Dunholme, see under DUNHAM.

Dunkeld, tn. of Scotland, in the co. of Perthshire. It stands on the N. bank of the R. Tay, 15½ m. by rail from Perth. A bridge of seven arches (which was opened in 1808) here spans the riv. The tn. is said to have derived its name from a Culdee church, founded in 815 by Constantine, King of the Picts. Opposite D. is Little D., famed for its waterfalls. The cathedral, once the seat of the Scottish primates, contains a recumbent figure, in armour, of the Wolf of Badenoch. The most celebrated bishop was Gavin Douglas, translator of Virgil. The choir is still used as the par. church. Pop. 1000.

Dunkers, Dunkards, or Tunkers, also called 'Dippers,' and by themselves 'The Brethren,' a sect of Ger. Baptists founded in Germany in 1708 by Andrew Mack, of Swartzenau. Persecution began, and the Dunkers fled to Holland, and from thence between 1719 and 1729, emigrated to N. America, settling first in Pennsylvania round Philadelphia. They now number over 100,000, have many converts in Canada, and support missions in Europe, India, and Asia Minor. Their creed is strictly evangelical, and they enforce baptism by immersion, and only for adults. They resemble the Quakers in the plainness of their dress, in the avoidance of war and litigation, and in the refusal to take oaths. See also BROTHERS, CHURCH OF.

Dunkery Beacon, hill in Somersetshire, Eng., 1700 ft. high, the highest point on Exmoor. Owned by the National Trust.

Dunkirk (Fr. *Dunkerque*), fifth port of France, on the Straits of Dover, before the Second World War had communication with the whole world, but especially with Tilbury and Hull in England, Antwerp, Germany, the Atlantic and the Mediterranean, and by canals with the whole of E. France. It imported iron, wool, cotton, textiles, phosphates and nickel, and exported provisions and manuf. goods. It manufs. goods of hemp, jute, and iron, and refined petroleum. The pirates or privateers of Dunkirk preyed on Eng. commerce until in 1713 the treaty of Utrecht provided that the port should be filled up, and it remained so until 1783. It was in the possession of England from 1658 to 1662, when Charles II. sold it to Louis XIV. who fortified the harbour, making D. of great strategic importance. It was vainly besieged by the Eng. in 1793. Jean Bart was born here in 1651.

During the First World War, D. became a base for Brit. aircraft and seaplanes, mainly to deal with Ger. air raids over England. The base was estab. in 1914, and gradually expanded with the needs of the war. During the latter part of 1915 offensive raids against the Germans were made successfully by the D. station, the success of which led to its prompt development and expansion as a base. Working in close co-operation with the aircraft on the W. Front, it achieved notable successes, both in fighting and bombing. On May 23, 1917, a Ger. flying squadron raided S.E. England, and although the entire squadron escaped from England, one raider was brought down at sea by one of the D. station. Although it was one of their objectives, the Gers. never reached D., having been brought to a standstill at Nieuport, 20 m. to the E. The words 'ville héroïque sert d'exemple à toute la nation' were added to the arms of the tn. in 1917. The name of D. will go down in hist. for the successful evacuation in 1940 of the Brit. Army from its beaches. The Brit. forces, together with some allied contingents, began to withdraw to the Fr. coast on May 29. Some 220 or more Brit. naval vessels and more than 660 others, mostly small boats, took part in evacuating the troops. By June 3, the evacuation of over 337,000 Brit. and allied troops was completed for the loss of six destroyers and twenty-four minor war vessels, and about 1000 guns, together with all transport and vehicles. See under WESTERN FRONT IN SECOND WORLD WAR. D. was destroyed to the extent of ninety per cent. of its buildings, one of the sole remaining considerable buildings being the sub-prefecture where, on March 1, 1947, was signed by Mr. Ernest Bevin and M. Bidault, the Anglo-French Treaty of Alliance, to subsist for 50 years. Pop. (tn.), 10,500; (Arron.), 257,600. See under EUROPE.—*The Second World War* and *WESTERN FRONT IN SECOND WORLD WAR*. See E. K. Chatterton, *The Epic of Dunkirk*, 1940; J. Masefield, *The Nine Days Wonder*, 1941.

Dunkirk, city of Chautauque co., New York, U.S.A., on Lake Erie, and 48 m. S.W. of Buffalo by rail. It has a good harbour and lake traffic, and has railway repair works, and manufs. locomotives, motors, agric. implements and other iron goods. Pop. 17,700.

Dun Laoghaire, or Dunleary, see KINGS-TOWN.

Dunlin, Oxbird, or *Tringa Alpina*, species of Charadriidae which inhabits the N. parts of both the Old and the New World, and frequents flat coasts and tidal rivs. of Britain. The colours of this sandpiper are reddish black, white, and grey, and both bill and feet are black: in winter the plumage is grey and white. In habit it is gregarious.

Dunlop, par. of Ayrshire, Scotland, 8 m. N.N.W. of Kilmarnock, which gave its name to a popular cheese. Pop. 1490.

Dunlop, Frances Anne Wallace (1730-1815), friend and correspondent of Robert Burns, whose acquaintance she made as a result of her admiration for *The Cotter's*

Saturday Night, 1786. He wrote to her frequently, and was in the habit of enclosing poems in his letters, among those which he sent to her being *Auld Lang Syne*, and *Farewell, thou fair day*. He named his second son Francis Wallace after her. See W. Wallace (ed.) *Correspondence of Burns with Mrs. Dunlop*, 1898.

Dunlop, John Boyd (1840-1921), re-inventor of the pneumatic tyre, which was first patented by one Thompson in 1846. B. at Dregghorn, Ayrshire, Scotland. Went to Belfast 1867, and while working as a veterinary surgeon devised the Dunlop tyre, 1887. He sold out to Harvey du Cros in 1889, removed to Dublin in 1892 and kept a drapery estab. at Ball's Bridge, where he died.

Dunlop, John Colin (1785-1842), Scottish man of letters. He is noted for his *History of Fiction* (1814) which is still recognised as the best work on the subject. He also wrote *A History of Roman Literature* (1823-28) and *Memoirs of Spain during the Reigns of Philip IV. and Charles II.* (1834).

Dunlop Rubber Company. Received its present name in 1900, being previously registered in 1896 as Byrn Bros. India Rubber Co. Its authorised capital is £20,000,000. The company owns *inter alia* the cap. of 'Dunlop' manuf. companies in France, Japan and other countries, and of 'Dunlop' trading companies in most of the chief countries of the world. It also controls the Dunlop Tyre and Rubber Corporation, of New York, which was incorporated in 1919 as Dunlop (America) Ltd. This corporation has tyre manuf. plant in Buffalo and spinning mills in Utica, New York State. Sir Eric Geddes (1875-1937) was chairman until his death.

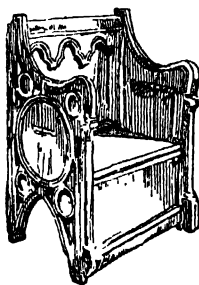
Dunluce, Earl of, see ANTRIM, MARQUESS OF.

Dunmanway, mkt. tn. of Eire, co. Cork, 30 m. W. thereof. It manufs. flannels, blankets, tweeds, and friezes, and has flax mills and tanneries. Pop. 1600.

Dunmore: (1) Vil. and watering place of Eire, on Waterford harbour, in co. Waterford, and 8½ m. S.E. of the city of that name. Pop. 500. (2) Small mkt. tn. in co. Galway, Eire, 7½ m. N.N.E. of Tuam. Pop. 600. (3) Banking post-bor. in Lackawanna co., Pennsylvania, U.S.A., on the Erie and Lackawanna railroads, adjoining Scranton. The tn. was incorporated in 1862. It is an important centre for anthracite coal, iron, and brick, and has flourishing silk industries. Pop. 23,000.

Dunmow: (1) *Great Dunmow*. Small mkt. tn. in Essex, Eng., on the R. Chelmer, 13 miles north of Chelmsford. It is thought to be the site of the Roman station of Caesarmagnus. The fine parish church, of thirteenth-fifteenth century dates, contains a curious gallery in the S. aisle. The tn. hall was built in 1578 and enlarged in 1855. There is a bacon factory. Pop. 2750. (2) *Little Dunmow*. 2 m. E. of Great Dunmow, owes its importance to a priory of Austin canons, founded 1106. The par. church

consists of the S. aisle of the chancel of the cruciform priory church, the foundations of which have been partially excavated. The Dunmow Flitch of Bacon was instituted in 1244 by Robert de Fitzwalter as a prize to any married couple who 'will go to the priory, and kneeling on two sharp pointed stones, will swear that they have not quarrelled nor repented of their marriage within a year and a day after its celebration.' The first recorded award was made in 1445, and successful claimants still continue to come forward, although the award was not made during



THE DUNMOW FLITCH CHAIR IN WHICH CLAIMANTS SAT

the Second World War. See W. Andrews, *History of the Dunmow Flitch*, 1877; J. W. Robertson-Scott, *The Strange Story of the Dunmow Flitch*, 1909. Pop. 320.

Dunmurry, vil., co. Antrim, N. Ireland, on the Glenwater, 1½ m. S. by W. of Belfast. It has linen manufs. Pop. 1500.

Dunn, James Nicol (1856-1919), Scottish journalist. Educated for the law, but gave up legal studies for journalism. Joined the staff of the *Dunder Advertiser* as a reporter, and later acted as special correspondent to the *Scotsman*. While with this paper he assisted in producing *Art and Literature and Pen and Pencil*. To him belongs the credit of bringing out such writers as George Stevens and W. E. Henley. In 1895 he was editor of *Black and White*, which periodical under his direction flourished considerably. His best days, however, were from 1897 to 1905, during which period he was editor of the *Morning Post*, in which capacity he enjoyed great popularity among the writers and artists of the London press.

Dunn, Samuel (d. 1794), Eng. mathematician. He wrote on astronomical subjects and is chiefly noted as the inventor of the 'universal planispheres or terrestrial and celestial globes in plano.' Author of *The New Atlas of the Mundane System* (1774) and *The Navigator's Guide to the Oriental or Indian Seas* (1775).

Dunnage, name given to the loose logs of wood that are placed between the cargo in the hold of a ship to keep it steady.

Dunne, Finley Peter (1867-1936), Amer. humorist, b. in Chicago. He became a newspaper reporter in 1885; city editor of the *Chicago Times*, 1891-2; joined the staff of the *Chicago Evening Post* and *Times Herald*, 1892-7; and was appointed editor of the *Chicago Journal*, 1897-1900. He is well known as the creator of 'Mr. Dooley,' the incomparable Irish-Amer. philosopher of Archey Road. The sayings of this character on social and political questions first appeared in the *Chicago Journal*, and were collected in 1898 under the title of *Mr. Dooley in Peace and in War*. This was followed by *Mr. Dooley in the Hearts of his Countrymen* (1898), *Mr. Dooley's Philosophy* (1900), *Mr. Dooley's Opinions* (1901), *Observations by Mr. Dooley* (1902), *Dissertations by Mr. Dooley* (1906), and *Mr. Dooley Says* (1910). See E. Ellis, *Mr. Dooley's America*, 1911.

Dunnet Head, most N. point on the mainland of Great Britain. It is a rocky peninsula in Caithness, Scotland, 346 ft. high, with a lighthouse on its summit, and the small fishing vil. of Dunnet on the S.W. of the bay.

Dunning, John, see ASHBURTON, BARON.

Dunnose, rocky headland on S.E. coast of the Isle of Wight, England.

Dunnville, farming vil. and port of entry in Haldimand co., Ontario, Canada; on the Grand R. and the Grand Trunk Railway, 40 m. S.S.E. of Hamilton. It is an important agric. dist. and the tn. has lumber interests. Pop. 3000.

Dunois, former ter. of France, in the prov. of Orléannais, comprising the present depts. of Eure-et-Loir, Loir-et-Cher, and Loiret.

Dunois, Jean, Comte de (c. 1403-68), Fr. soldier, commonly known as the 'Bastard of Orléans,' being the natural son of Louis, duke of Orléans (brother of Charles VI.) and Marie of Enghien. He fought at Beaugé (1421) and Verneuil (1424), and defeated the Eng. at Montargis (1427). He held Orléans till the arrival of Joan of Arc in 1428, and in the following year with her won the battle of Patay. He laid siege to Chartres and Lagny in 1432, and drove the Eng. from Paris in 1436, and from many cities in Guienne. He joined the league of revolted nobles in 1464, for which act Louis temporarily deprived him of his estates.

Dunolly, tn. of Gladstone co., Victoria, Australia, 30 m. W.N.W. of Castlemaine. Pop. 1000.

Dunoon, popular watering-place of Cowal, Argyllshire, Scotland, on the firth of Clyde, 7½ m. W. of Greenock. The ruins remain of a castle which was formerly the seat of the Stewarts. It was the site of hanging of thirty-six Lamonts by the Campbells in 1643. There is a monument to Robert Burns's Highland Mary, who was born in D. The tn. is pleasant and well built, with a steamboat pier and esplanade, and is the scene of the ann. Cowal highland games. Pop. 8700.

Dunraven and Mount Earl, Windham Thomas Wyndham-Quin, fourth Earl of (1841-1926), Eng. politician, b. at Adare

Abbey. In 1902 he was chairman of the Irish Land Conference, and became President of the Irish Reform Association. He strongly advocated the policy known as 'devolution,' which was denounced by the gov., with the result that the chief secretary of Ireland, Mr. Wyndham, resigned from office in 1905. Lord D. was a keen yachtsman, and twice tried, without success, for the America Cup, in 1893 and 1895. His pubs. include: *The Great Divide: Travels in the Upper Yellowstone in the Summer of 1874* (1876), *The Irish Question* (1880), *Self-Instruction in the Theory and Practice of Navigation* (1900), *The Legacy of Past Years* (1911), *The Crisis in Ireland: Federal Union through Devolution* (1920) and *Past Times and Pastimes* (1922).

Dunrossness, peninsula in the S. of Shetland mainland, Scotland, which terminates in Sumburgh Head. The par. includes part of Pomona and Fair Is. Picts Castle is a cylindrical structure or broch 153 ft. in circumference at the base and 40 ft. high. Pop. 3000.

Duns, or **Dunse**, police bor. of Berwickshire, Scotland, 30 m. W. of Berwick-on-Tweed. It has a corn exchange and a tn. hall. Duns Scotus and Thomas Boston were natives. In 1699 Gen. Leslie, with his army of Covenanters, encamped on Duns Law, a high mound rising some 700 ft. Pop. 1700.

Dunsany, Edward John Moreton Drax Plunkett, eighteenth Baron, Irish playwright; b. July 24, 1878; eldest son of seventeenth baron. Educated at Eton and Royal Military College, Sandhurst. Formerly Lieut., Coldstream Guards; Captain, Royal Inniskilling Fusiliers. Succeeded to barony, 1899. Fought in the S. African War 1899-1900, at Battles of Belmont, Graspan, Modder R., and Magersfontein; and in the 1914-18 War. Unsuccessfully contested W. Wilts. as a Conservative, Jan. 1906. In 1909 his first play, *The Glittering Gate*, was produced at the Abbey Theatre, Dublin. The play shows a dead burglar and a dead murderer, before the gate of heaven which they have to force open to gain admission to find nothing inside. In 1911 came *King Argimenes and the Unknown Warrior*; also—probably his best play—*The Gods of the Mountain*, in which a company of beggars, with an artful genius to lead them, impose themselves upon a city as gods—with the result they are punished by becoming real green-jade gods, pure and immovable. Other plays of his are: *The Golden Doom* (1912), *A Night at an Inn* (1916), *The Tents of the Arabs* (1920), *The Laughter of the Gods* (1919), *If* (1921), *Alexander*, and *Three Small Plays* (1925), *Mr. Faithful* (1927), *The Old Folk of the Centuries* (1930), *Lord Adrian* (1933), *Plays for Earth and Air* (1937). These plays are intellectual dreams. They deal in mythology; but it is a mythology of the author's own. He has also pub. some vols. of tales notably those of the adventures of 'Mr. Jorkens.' Also writes novels, one of his best being *The Wise Woman* (1933). See D.'s autobiography, *Patches of Sunlight* (1938).

Dunscore, vil. of Scotland, in co. Dumfries, 10 m. N.W. of the tn. of that name. It is chiefly noted for the fact that Burns once lived there. Pop. 1600.

Dunstman, one of the Sidlaw Hills in Perthshire, Scotland. It has an elevation of 1012 ft., and is situated 8½ m. N.E. of Perth. On its summit are the remains of 'Macbeth's Castle,' where Siward, Earl of Northumbria, is supposed to have defeated Macbeth in 1054. See Shakespeare's *Macbeth*, IV. i. 92.

Dunsink, hill 4 m. N.W. of Dublin, on which is the observatory of Trinity College.

Duns Scotus, Johannes (1265 or 1274-1308), medieval philosopher. His birth-place is uncertain, Duns in Berwickshire, Dunstan in Northumberland, and Dunum (Down) in N. Ireland, all claiming that honour. It is supposed that he became a Franciscan and studied and lectured (about 1301) at Oxford. In 1304 he moved to Paris, and three years later the doctor's degree was conferred upon him by the univ., and he was appointed regent of the theological school. In 1308 he was despatched to Cologne to found a univ. and d. there a few months after his arrival. D. S. acquired the title 'Doctor Subtilis' on account of his dialectical ingenuity and wit. In philosophy he revived nominalism in a mitigated form and denied the real distinction between essence and existence. In theology he strongly upheld the doctrine of the Immaculate Conception, which was opposed by the Dominicans, called Thomists, because they were followers of Thomas Aquinas. Scotus also preached that no one could attain to a pure knowledge of theology by reason alone, that revelation must give part of that knowledge. During the Revival of Learning, the Scotists, we are told, 'raged in every pulpit,' and thus 'Dunsinon' gave the word 'dunce,' meaning a dullard, or ignoramus. Scotus wrote commentaries on the Bible and on Aristotle, and the *Sentences* of Peter Lombard, called *Opus Oxoniense*, or *Inlincanum*. A complete ed. of his works was pub. in thirteen vols. by Luke Wadding in Lyons, 1639; reprinted (Paris), 1891-5. See W. J. Townsend, *The Great Schoolmen*, 1881; R. Seeberg, *Die Theologie des Duns Scotus*, 1900; E. Longpré, *La Philosophie du Duns Scotus*, 1921; C. R. S. Harris, *Duns Scotus* (with bibliography) 1927.

Dunstable, tn. 36½ m. N.W. of London, in the S. of Bedfordshire. It is connected by branches with two main railway lines. Since the eighteenth century it has been chiefly engaged in the manuf. of straw hats and now has also considerable printing works, and manufs. of sparking plugs. D. is linked with hist., because its Augustinian priory, founded by Henry I. in the early twelfth century, was the scene of the first miracle play performed in England; because Cranmer here annulled Catherine of Aragon's marriage (1533), and because until 1643 it possessed an Eleanor Cross. The church of St. Peter and St. Paul is a remnant of the old priory. On the nearby D. Downs is the London Zoological Society's Whipsnade zoo, and the head-

quarters of the London Gliding Club. Pop. 8900.

Dunstaffnage, ruined castle in Argyllshire, Scotland, on Loch Etive, 24 m. N.E. of Oban. According to tradition it was the royal seat of the Dalriadan kings. It was captured by Robert the Bruce in 1308, and became the stronghold of the Campbells and Macdonalds. It formed an Eng. military station during the risings of 1715 and 1745, and for a while the prison of Flora Macdonald in 1746. In 1910 the duke of Argyll disputed the ownership, but the case was decided in favour of A. J. Campbell, hereditary captain of D.

Dunstan, Saint (c. 925-988), Eng. archbishop and statesman, b. at or near Glastonbury, in Somersetshire of noble parents. After receiving a careful education, he was taken by his uncle, Aldhelm, to Athelstan's court. He did not remain here, however, but retired to a hermitage near Glastonbury, where he devoted himself to a life of prayer and austerity. In 940, on the accession of Edmund, D. was called from his retirement and made Abbot of Glastonbury, and he rebuilt and restored the abbey. The next king, Edred, gave D. almost unlimited power, and the prelate used this to introduce the Benedictine order into England and strictly enforce ecclesiastical discipline. For a time D. lost his influence, but it was soon regained, and in 959 he was made archbishop of Canterbury. He maintained almost absolute power during the reigns of Edgar and Edmund, but his credit and influence declined after the murder of the latter prince. He retired to Canterbury, where he died.

Dunstanburgh Castle is situated on the Northumbrian coast, England, 8 m. N.E. of Alnwick. The cliffs are basaltic in structure, and the quartz crystals found in the neighbourhood are called Dunstanburgh diamonds.

Dunster, picturesque mkt. tn. in Somersetshire, England, 23 m. N.W. of Taunton. Has an ancient castle and a quaint wooden yarn mkt. Pop. 850.

Dunsterville, Major-General L. C. (1865-1946), Brit. soldier, who entered the Royal Sussex Regiment in 1884, reaching rank of Major-Gen. in 1918. He transferred to the Indian Staff Corps in 1887, and held various important staff appointments. Served in the Waziristan 1894-1895, N.W. Frontier (India) 1897-8, China 1900, and Great War campaigns. Commanded Dunster Force, expedition to Baku, which was detached from Mesopotamian Expeditionary Force from Jan. to Sept. 1918. D. was Kipling's original of 'Stalky.' He wrote *Adventures of Dunster Force* (1920), *Stalky's Reminiscences* (1928), *More Farns* (1931), and *Stalky Settles Down* (1933).

Duntocher, tn., Scotland, co. Dunbarton, 8 m. N.W. of Glasgow. Manufs. farm tools. Pop. 3000.

Dunton, John (1650-1733), Eng. bookseller, b. at Graffham, W. Sussex, who had a business at the Sign of the Raven, near the Royal Exchange, London. He pub. a number of political pamphlets and satires

on the Whig side, and an interesting autobiography, *The Life and Errors of John Duntun* (1705), ed. with a memoir by J. Nichols (1818).

Dunwich, par. and vil. of England in E. Suffolk. It is situated on the coast $4\frac{1}{2}$ m. S.W. of Southwold. It is now merely a small watering-place, owing to the disastrous action of the sea, which has been undermining the tn. since the fourteenth century. It is, however, historically interesting. King Sigebert built there a palace for himself and a church for Bishop Felix. It was formerly the cap. of E. Anglia and from 673 to 870 the head of a bishop's see. In the reign of Edward III. the sea destroyed 100 houses. It sent two members to Parliament from 1296 to 1832. The corporation was not abolished until 1886, although the pop. was only 189 in 1920. There was a monastery at D. until the sea swallowed it up. Pop. 150.

Duodecimals, system of arithmetical notation where the local value of a digit increases by powers of 12 as it moves to the left, instead of by powers of 10 as in the ordinary or decimal notation. Two extra symbols are required, one to denote 10 and one to denote 11. The advantage of such a system, if universally adopted, arises from the fact that 12 splits up into the small factors 2, 2, 3. This method of notation was used by the Babylonians and other auct. peoples, and remains today in measures of quantity, i.e. dozen (12), gross (12 \times 12 = 144); in the divs. of the clock; Eng. currency (12d. = 1s.), etc. *D. arithmetic*, as practised by surveyors, is a system by which the calculation of square measure and cubic measure is reduced to operations in the powers of 12. The table for square measure is 12 sq. in. = 1 superficial prime; 12 superficial primes = 1 sq. ft. That for cubic measures is 12 cub. in. = 1 solid second; 12 solid seconds = 1 solid prime; 12 solid primes = 1 cub. ft.

Duodenal Ulcer, see under ULCER.

Duodenum, see under DIGESTION and INTESTINES.

Dupanloup, Félix Antoine Philibert (1802-78), Bishop of Orleans, born at St. Félix, near Chambéry in Savoy. Ordained a priest in 1825, he became a vicar of the Madeleine, Paris, and for a time tutor to the Orleans princes. Later he founded the famous academy at St. Hyacinthe. In 1819 he was appointed Bishop of Orleans. His educational doctrines had a far-reaching influence, and he wrote many books on the subject to propagate his theories. Among these are: *Méthode générale du catéchisme* (1811); *De l'Éducation* (1850); *De la Haute Éducation intellectuelle* (1855); and *L'Enfant* (1869). D. was a leader of the moderate Catholics, and his writings on eccles. and religious subjects include *La Souveraineté pontificale* (1860), *Le Mariage chrétien* (1869), and *Histoire de Notre Seigneur Jésus Christ* (1870). The *Journal intime de Mgr. Dupanloup* was ed. by Branchereau in 1902. See lives by F. Lagrange (Eng. trans. by Lady Herbert, 1885), E. Faguet, 1914. **Duparc (Marie Eugène), Henri (Fouques)** (1848-1933), Fr. composer, b. at Paris.

He was educated by the Jesuits at the Collège de Vaugirard, where he learned pianoforte from César Franck, and afterwards took private lessons in composition from the same master. His few works include a symphonic poem, *Lenore*, and a nocturne *Aux Étoiles*, but he is chiefly remembered for fifteen songs, among them 'Soupir' and 'Chanson Triste.' He was a fierce critic of his own work and destroyed sev. songs, and the music he wrote for Pushkin's *Rusalka*. He retired to Switzerland, suffering from neurasthenia, and died almost fifty years after his last pub. composition.

Duperrey, Louis Isidore (1786-1865), Fr. navigator, b. in Paris. He accompanied Freycinet on his voyage of exploration in the N. Pacific (1817-20), and on his return to France he was given the command of the *Cockle*. In 1822-25 he explored parts of Australia and New Guinea, and on his return pub. *Voyage autour du Monde* (1826-30).

Dupin, André Marie Jean Jacques (1783-1865), known as the Elder (in reference to his brother, Charles (1784-1873), engineer and economist), Fr. statesman and advocate born at Varzy in Nièvre. In 1811 appointed to serve on the commission charged with codification of the laws of the empire, and in 1815 he sat for a few months in the Chamber of Deputies on the side of the Liberal Opposition. He was president of the Chamber eight times between the years 1832 and 1848, resigning in 1848 on failing to secure the crown for the young count of Paris. The emperor restored him to his former office in 1857. D.'s writings are numerous and include: *Principia Juris Civitatis* (1806), *Mémoires et plaidoyers de 1860 au 1^{er} janvier* (1830), and *Mémoires ou souvenirs du Barreau* (1855-57). See J. Ortolan, *Notice sur Dupin*, 1840.

Duplex, Joseph François, Marquis de (1697-1763), governor-gen. of Fr. India, b. at Landrecies, Nord, France. In 1715 he went to India in the service of the Fr. E. India Company and in 1720 was elected a member of the council at Pondichéry. In 1742 he was appointed governor-gen. of Fr. India. When war broke out between France and England in 1744, D. strove to obtain the ascendancy of France in India by making overtures to the native princes. He laid siege to Fort St. David (1747), and spread his troops over the Carnatic. He attempted the subjugation of the S. of India, and at one time was proclaimed its viceroy by the natives. His plans were, however, defeated by Clive, until he was summarily recalled by the Fr. gov. in 1754, and was never rewarded for the undoubted services he rendered to his country. See Thibault Hamont, *Duplex, d'après sa correspondance inédite*, 1881; H. Castelnau, *Duplex, ses expéditions et ses projets*, 1888; G. B. Mallison, *Duplex (in the Rulers of India series)*, 1890; and the lives by E. Guérin, 1908, and J. Bid-dulph, 1911.

Duplex Querela (Lat., twofold complaint), process in eccles. causes, consisting of an appeal from an authority to one

above it, as from a bishop to an archbishop, and from an archbishop to the crown in council.

Duplicate Ratio, the proportion or ratio which the squares of any numbers bear in relation to that of the radical quantities. If any number of quantities be continued proportionals, the ratio of the first to the third will be a duplicate ratio of that of the first and second.

Dupniza, tn. of Bulgaria, 22 m. S. of Sofia. It grows tobacco and is noted for its springs. Pop. 15,000.

Dupont de Nemours, Pierre Samuel (1739-1817), Fr. economist and statesman, b. at Paris, negotiated with the Eng. commissioner the recognition of the independence of the U.S.A. Went to U.S.A. in 1799, where he was employed by Jefferson. His family settled in U.S.A., where they estab. themselves at Powder Mill in Delaware, in the production of gun-powder. The business grew, and by 1803 the descendants of D. de N. controlled 100 companies; in 1915 *E. I. Du Pont de Nemours & Co.* was founded in Delaware and became a leading Amer. chemical firm with many and varied interests, among them the production of nylon artificial silk.

Dupont, Pierre (1821-70), Fr. poet, b. at Lyons, son of a blacksmith, but being left an orphan at the age of five, he was brought up by a village priest. In 1839 he went to Paris, and three years later a song of his received a prize from the Academy. His best-known songs are: *La Chanson de blé*, *La Vache blanche* and *Le Braconnier*. They were collected under *Chants et chansons* (1852-54) and *Chants et poésies* (7th ed. 1862). See *Déchant, Biographie de Pierre Dupont*, 1871, and C. Lenient, *Poésie patriotique en France*, 1889.

Düppel, or **Dybol**, vil. of Sleswig, Denmark, on the peninsula of Sundewitt, 15 m. N.E. of Flensburg. It was the site of a struggle between the Danes and Gers. in 1848-49, and was bombarded by the Prussians in 1864.

Dupré, Giovanni (1817-1869), Tuscan sculptor, of humble Fr. origin, b. at Siena. As a boy he was put to hard manual toil, but was early fortunate in obtaining the help of the Rom. priesthood, who gave him the means of studying sculpture. Some busts of cardinals shown in Rome made a sensation. These were followed by the figures of 'Abel and Cain,' a work which was shown at the Paris Salon in 1855. Among his best works were the 'Triumph of the Cross'; a superb figure of 'Cain'; 'Pietà'; and the bust of Mme. Dora D'Istria. He died in poverty. See life by H. S. Fricze, 1888.

Dupré, Jules (1811-89), Fr. painter, b. at Nantes. He was the son of a porcelain manuf., and worked first in his father's, and later in his uncle's china factory. D. belonged to the romantic school of landscape painters, and painted nature best in her tempestuous moods. On his visit to England in 1831 he learnt much from Constable's pictures. D.'s best-known works are: 'The Forest of Fontainebleau,' 'Morning and Evening.'

His 'Crossing the Bridge' is in the Wallace Collection, London. See life by J. Claretie, 1879.

Dupré, Marcel (b. 1886), Fr. organ-virtuoso and composer, and one of the greatest improvisators. Organist at Notre-Dame, Paris.

Dupuy de Lôme, Stanislas Charles Henri Laurent (1816-85), Fr. naval architect, b. at Plœmeur, near L'Orient. He studied at the Ecole Polytechnique and in England. He designed the first Fr. war steamer, the *Napoléon* (1848-52), and invented methods of changing sailing men-of-war into steamers. During the siege of Paris he planned a steering balloon, but the siege was over before it was put to any use. He was appointed Inspecteur-Général du Matériel de la Marine in 1866, was elected a member of the Academy of Sciences in 1866, and a senator for life in 1877.

Dupuytren, Guillaume, Baron (1777-1835), Fr. surgeon, b. at Pierre-Builière, Haute Vienne, struggled with poverty until, in 1801, he received a coveted anatomical appointment in Paris. His connection with the Hôtel-Dieu dates from 1808, and in 1815 he became chief surgeon. He was an indefatigable student, especially of morbid anatomy, enjoyed a high reputation for the skill with which he performed a number of difficult operations, and throughout his life lectured to crowded halls of students. Among his best known works the *Traité sur l'Artificial Anus* (1828) is one of many.

Duquesne, banking post-bor. of Allegheny co., Pennsylvania, U.S.A., 10 m. S.E. of Pittsburgh, on the Monongahela R., and on the Pennsylvania Railroad. It has steel works and blast. furnaces. Pop. 20,600.

Duquesne, Abraham, Marquis (1610-1688), Fr. admiral, b. at Dieppe. He first joined the merchant service, and took part in the defeat of the Spaniards at the capture of the Lerins Is. (1637). He also fought at Guetaria (1638), Coruña (1639), Tarragona (1641), and Barcelona (1643). In 1676 he defeated the combined fleets of Spain and Holland off Stromboli, for which victory he was made a marquis by Louis XIV. He also bombarded Algiers (1682-83) and Genoa (1681), and did much service to his country by reorganising the Fr. fleet. See A. Jal, *Abraham Duquesne et la Marine de son Temps*, 1873.

Duquesne, Fort, Fr. fort and trading-post built in 1754 on the site where Pittsburgh now stands. The Brit. expedition against it under Braddock was repulsed in 1755, but in 1758 Gen. Forbes captured it from the Fr., and in the following year began the building of Pittsburgh and Fort Pitt, in honour of William Pitt, then Prime Minister of England.

Duquesnoy, François (1549-1646), a Flemish sculptor, commonly known as François Flaminio or (lt.), Il Flaminio. He chiefly excelled in modelling children. He executed groups of children for the high altar at St. Peter's, Rome; a 'Concert of Cherubim' in the church of the

Holy Apostles, Naples; 'St. Susanna,' in the Loretto church at Rome; and 'St. Andrew,' in the basilica of St. Peter's. D. died at Livorno and it was supposed that he had been poisoned by his brother.

Duralumin, alloy of aluminium (94 per cent), containing also copper, manganese, magnesium and silicon. It was invented in 1906 by Wilson, and for many years was the strongest of light aluminium alloys, having the then peculiar property of hardening spontaneously after a special heating process. But since then (c. 1925) various other alloys having similar properties have been developed. In its strongest state D. is as good as mild steel, but not so ductile and only one-third of its weight. Resists atmospheric corrosion but requires protection against sea water.

Duramen, in botany, is the heartwood, or older internal portion of the secondary wood, as distinguished from the outer sap-wood (*alburnum*).

Durance, riv. of France, which rises near Mont Genève. Its course is chiefly S.W. until it reaches Pertuis, when it turns N.W. It passes through Hautes-Alpes and Basses-Alpes. About 3 m. S.W. of Avignon it joins the Rhone. Its total length is 218 m., and the chief tributaries are the Buech and Verdon.

Durand, Charles Auguste Emile, see CAROLUS-DURAN.

Durango, (1) mountainous state of Mexico, 42,272 sq. m. in area, with a pop. of 483,800. The rugged peaks of the Sierra Madre cross the W. where grizzly bears, wolves, deer and wild turkeys are found. Cotton is indigenous; Columbus saw Indians clothed with it in 1502. The Toltecs believed that the god of the air had taught them its use, and it is still one of the great staples of D. Corn, tobacco, fruits, and sugar cane are also produced, and cattle-breeding is carried on. The iron mt. is almost the only one known, and is nearly 1 m. in length. There are also rich gold, silver and copper mines. (2) Cap. of the state 6207 ft. above sea-level, has an almost matchless climate, and the region round it is an open-air sanatorium. The cathedral is 250 ft. long by 153 ft. high. The cotton mills are important. Men and women promenade in the evening separately, going in opposite directions. There is a Bull Ring, as in other Mexican tns. Pop. 33,000. (3) Tn. in the Basque Provs., Spain. Pop. 3500.

Durānis, or **Durrānis**, the dominant race of Afghans, comprising the Zirk and the Panjpal. They inhabit the N. slopes of the Safed Koh.

Durant, banking post-tn. in Bryan co., Oklahoma, U.S.A., 19 m. N.E. of Denison. It is an agric. centre, and has cotton and cotton-seed oil industries. The tn. received a charter in 1904. Pop. 10,000.

Durante, Ser, poet of Tuscany who flourished in the early part of the thirteenth century and made an adaptation of the *Roman de la Rose*. See G. Massatinti, *Inventario dei MSS. Italiani delle Biblioteche di Francia* (vol. III.), 1888.

Durazno, name of a dept. and city of Uruguay, S. America. Vast numbers of sheep are pastured in the dist. The tn.

is on the main line from Montevideo to Rivera, and is situated on the Y1 R. Area of the dept. 5525 sq. m. Pop. 95,100; (tn.) 13,500.

Durazzo, or **Durrës** (anct. **Epidamnus** and **Dyrrachium**), port on the bay of Durazzo, some 49 m. S. of Scutari (Shkodër), in Albania. Epidamnus was founded in the seventh century by settlers from Corinth and Corevra. The Romans, who seized it early in the fourth century B.C., preferred to call the place Dyrrachium. It was a favourite harbour at which to embark Roman troops sailing eastward, and it was here that Pompey gained a short-lived triumph over Caesar, before his defeat at Philippi (48 B.C.). It was destroyed by an earthquake in 345 A.D., and was besieged and taken in 481, 1082 and 1185. Belonged to Venice from 1392-1501, and then to the Turks. It was the cap. of Albania during the 1914-18 War. A sand bar blocks the harbour, though olive oil and grain are still exported. From it the retreating Serbs were shipped to safety in 1915 by Fr. vessels. Pop. 9000.

Durban, port and largest city of the prov. of Natal, S. Africa. It lies on a landlocked tidal bay and a magnificent harbour, the only one of any importance between Delagoa Bay and E. London. The inner basin covers about 7 sq. m. with 3 m. of quays, and a flying boat station. It is the clearing-house for all the coast products, such as sugar, tea, coffee and fibre. It exports the coal of Natal, and has a whaling industry. D. has become a sea-side resort, and many thousand visitors live there during the winter, when the climate resembles that of the S. of France. The tn. and suburbs are very beautiful, especially that on the Berea, a range of hills with fine views, on which there are four public parks. Fruit is very plentiful, including the orange, mango, pineapple, guava, shaddock, etc. There are an art gallery, a museum, a handsome tn. hall, etc., erected at a cost of £352,000, new law courts, a Market House which cost £57,000, and botanic gardens. The Victoria Embankment along the Bay side has a memorial to Vasco da Gama, who is reputed to have passed what is now D. on Christmas Day, 1497, naming it Natal after the natal day of Christ; evidence, however, points to the fact that it was Pongoland which da Gama discovered. The city owes its foundation to Lieut. Francis Farewell who, impressed by the possibilities of the harbour, hoisted the Union Jack at Port Natal in 1824, obtaining a cession of land from King Chaka of the Zulus. The community was named D. in 1835, after Sir Benjamin D'Urban, then governor of the Cape. Salisbury Is., in Durban Bay, was converted into a naval base during the Second World War at a cost of some £2,000,000. The base grew out of a former mangrove swamp. A railway and road causeway linking the is. to the Bluff were also constructed. The base is commodious enough to take any type of ship in the Royal Navy. Pop. 338,800 of whom 117,200 are Europeans, and 221,600 are coloured.

See C. Russell, *Old Durban*, 1899; H. C. MacKerant, *Cradle Days in Natal*, 1930; A. F. Hattersley, *Portrait of a Colony*, 1940.

Durbar (from Persian *darbar*, meaning 'court' or 'audience'), the executive council of a native province of India and formerly used in this sense by Indian chieftains, who discussed state administration and other business in it. To-day the word is most commonly applied to such ceremonial gatherings or festivals as Lord Lytton held at Delhi in 1877, for the purpose of proclaiming Queen Victoria Empress of India. Delhi was the scene of similar state functions in 1903 and 1912, when Edward VII. and George V. were proclaimed emperor.

Düren, industrial tn. on the Roer, 18½ m. E. of Aachen, in Rhineland, Germany. It is a railway centre. Its Gothic church, the Annakirche, of the thirteenth to fourteenth century, the Gewandhaus of 1450, Kornhaus of 1588, and a museum suffered damage or destruction in bombing and the battles of 1945. It was noted for manufs. of metal goods, chemicals, glass and paper. In the early months of 1915 D. became the centre of most bitter fighting for the Roer riv. and suffered much destruction. The Amers. occupied half the tn. on Feb. 24, 1945, and the remainder a few days later. See WESTERN FRONT IN SECOND WORLD WAR. Pop. 40,000.

Dürer, Albrecht (Albert) (1471-1528), famous Ger. painter and engraver, son of a goldsmith. Founder of the Ger. school of painting, he was also considered the inventor of the art of etching and of printing woodcuts in two colours. His copper-plate engravings are especially famous, and he ranks higher as a designer of woodcuts than as a painter. In 1486 he became a pupil of the great painter Michael Wöhlgenuth. From 1490-94 he went on a tour probably through Ger., visiting Strasburg, Colmar, Basle, and Venice, where Mantegna's works impressed him greatly. On his return he married Agnes Frey, but their union is thought to have been an unhappy one. For a time he probably worked in Wöhlgenuth's studio, but by 1497 had one of his own. D. went to Venice, 1505-7, where he painted 'The Martyrdom of St. Bartholomew.' In 1512 he became court painter to Maximilian I., and painted for him 'The Virgin with many Angels.' He was deputy for Nuremberg at the Augsburg Diet, 1518, and painted Maximilian's portrait there. In 1521-2 D. and his wife visited the Netherlands and won the patronage of Charles V. He favoured the doctrines of the Reformation and was a disciple of Luther. The mural decorations of Nuremberg city hall—'The Calumny of Apelles' and 'The Triumph of Maximilian'—were designed by D. Among his most famous engravings are: 'Adam and Eve' (1504), 'The Nativity', 'The Great Horse' and 'The Little Horse' (1505), 'Melancholia' and 'St. Jerome in his Study' (1514), 'The Knight, Death, and the Devil' (1513), 'The Prodigal Son' (1503). Noted woodcuts are: 'The Apocalypse' (sixteen subjects, including

the Revelation of St. John, 1498), 'The Greater Passion' (twelve subjects), 'The Lesser Passion' (thirty-seven subjects). Among his best pictures are: 'The Feast of the Rosary' (1506, now in Strahow monastery, near Prague), 'Martyrdom of the 10,000 Christians' (1508, Vienna Gallery), 'Adoration of the Magi' (1504, Uffizi, Florence), 'Adam and Eve' (Florence), 'Adoration of the Trinity' (1511, Imperial Gallery, Vienna), 'The Four Apostles' (1526, Munich Gallery), 'Crucifixion' (1511). Among his portraits are those of Raphael, Melanchthon,



W. F. Mansel

ALBRECHT DÜRER

A self portrait at the age of 26

Erasmus, and himself. The series of engravings known as 'The Passion in Copper,' was done between 1508 and 1513. All D.'s work is marked by exuberant imagination, sublimity, and correctness of design, but some critics lament the lack of it, training. D. wrote on geometry and perspective, on mensuration (1525), on fortification (1527); *Vier Bücher über die Proportion* appearing in 1528. See Lady E. Eastlake, *Five Great Painters*, 1883; G. L. Schefer, *The Artist's Married Life*, 1818; D. Bueckhardt, *Dürers Aufenthalt in Basel*, 1892; M. Zucker, *Albrecht Dürer*, 1900.

Duress (from Lat. *duritia*, harshness), a legal term for 'constraint.' It is open to a defendant to advance a plea of D. if he has been driven by menace (*per minas*) of death or bodily harm to commit some act which would normally constitute a crime or misdemeanour. The constraint may also consist of imprisonment.

D'Urfev, Thomas (1653-1723), poet and dramatist, perhaps better known as 'Tom Durfev,' was a writer from childhood. At the age of twenty-three he witnessed the

production at the King's Theatre of his first play, *The Siege of Memphis* (1676), a tragedy that was not a success. He was happier in attracting favour with the many comedies that followed his first effort. He wrote a great number of popular songs. He also issued: *Tales Tragical and Comical* (1701), *Stories Moral and Comical* (1707), as well as other works. A noted wit, his presence was sought in society, and among his admirers was Charles II. See G. Daniel, *Love's Last Labour Not Lost*, 1863; S. Baring Gould, *Devonshire Characters and Strange Events*, 1908.

Durga, see Devi.

Durham, John George Lambton, Earl of (1792-1840), eldest son of W. H. Lambton of Lambton Castle, and M.P. for Durham, Eng. statesman, educated at Eton, and afterwards served in the 10th Hussars. At the early age of twenty, he married Miss Harriet Cholmondeley, by whom he had three daughters. After the death of his wife in 1815, he married in the following year Lady Louisa Elizabeth, a daughter of Earl Grey. In 1828 he was raised to the peerage, taking the title of Baron D. In 1830 he became a member of the cabinet as Lord Privy Seal. The liberality and ultimate success of the Reform Bill are said to be chiefly due to him. He went to Russia in 1835 as ambassador, and remained there two years, after which he was sent to Canada as Governor-General, 1838. His immediate task was to inquire into the causes of unrest in the provinces but though he successfully quelled all discontent, he remained in Canada only five months, resigning owing to criticism in England of his lenience towards the ringleaders of the rebellion in Lower Canada. But his famous Report issued in 1839, led to the Union of Upper and Lower Canada and the institution of a common Legislative Assembly responsible to the Executive Council. See DURHAM REPORT.

Durham, maritime co., with an area of 637,672 ac. in the N.E. of Eng., bounded on the N. by Northumberland, on the E. by the North Sea, on the S. by Yorkshire and westward by Westmorland and Cumberland. To the W. of a line drawn from Barnard Castle to Consett are highlands belonging to the Pennine Range, which rise to 2300 ft.; this dist. is mostly barren moorland. Loamy soil lies about the prin. rivs., the Tyne, Tees, and Wear. About a half of the co. is given over to pasturage, but oats and barley are grown. Sunderland (pop. 185,800) is the port for a valuable coalfield, and is the largest shipbuilding tn. in the Brit. Empire. There is also a large shipbuilding trade in Stockton-on-Tees (87,700) and West Hartlepool (68,100). The lead mines of Teesdale and the limestone quarries are a source of wealth. There are numerous iron foundries and glass, earthenware, and chemical works. Pop. 1,478,506.

Durham, co. tn. of Durham, England, lies 12 m. S. of Newcastle. Both the cathedral and the castle are magnificently situated on a tall rocky peninsula almost encircled by the R. Wear. In the year

995, Bishop Aldhun and his community of monks brought the incorrupt body of St. Cuthbert hither from Chester-le-Street, guided, so legend relates, by a girl looking for her lost dun cow. The site was then called Dunholme (Hill Island). Durham stood on the main line of Scottish invasions E. of the Pennines and so the community of St. Cuthbert was deliberately developed into a powerful buffer between Scots and Eng. The bishops became important secular rulers, holding sway over a 'county palatine' and having many royal privileges. They had their own



W. F. Mansell

THE NAVE OF DURHAM CATHEDRAL.

army which they often led in person. They also had their own courts, councils and judges of which traces remain in the Durham Court of Chancery and the Hall-mote Court. The bishop's palatinate powers were reduced progressively to the time of Wm. van Mildert (1826-36) who is reckoned the last of the 'prince bishops.' The cathedral as it now stands was begun in 1092 by Bishop Wm. of St. Calais. It is a stately pile with its massive Norman nave, its late Norman Giffard chapel, its Early Eng. Chapel of the Nine Altars and its Perpendicular tower. It housed a Benedictine monastery in its precincts until 1540. Of the monastic buildings remaining, the most interesting is the dormitory, one of the stateliest rooms in the country, built about 1400 and with the original oak roof still intact. This room is now used as a library and museum and contains various anct. MSS., the famous Conyers falchion, fragments of A.-S. crosses and other objects of interest. Leading from it is the 'loft', in which are kept the Cuthbert relics, fragments of the coffin made for the Saint in 698, his own portable altar and pectoral cross and the

oldest needlework in England, in the shape of the stole and manipie presented to St. Cuthbert's shrine by King Athelstan in 934. The cathedral occupies the S. side of Palace (or Place) Green. This green, like the Castle and most of the other buildings round it, now belongs to the univ. The building nearest the Castle gate, now part of the univ. library, was once the Exchequer built by Bishop Neville in 1450. Next door is the library built by Bishop Cosin in 1669 for the use of the diocesan clergy. On the opposite side are the seventeenth-century almshouses, now univ. lecture-rooms, also Cosin's work. The most remarkable features of the castle are the Norman chapel, dating back to 1072, the Norman gallery and doorway, the Great Hall dating back to 1072, the Norman gallery and doorway, the Great Hall dating from 1300, the kitchens built in 1499 and still used, and the Black Staircase built by Cosin in 1665. The tn. hall in the market place is modern (1851) and has some good modern stained glass. In the same building is the original guildhall where the city freemen held, and still hold, their meetings, for 8 of the 16 medieval freemen's guilds still survive. In the lobby are a portrait, a statue and some clothing of Joseph Boruwlaski, a Polish dwarf, 39 in. in height, who died in Durham in 1837, at the age of 98. The Mayor's chamber has eighteenth-century panelling and a fine Jacobean overmantel. Of the churches of Durham, the most remarkable are St. Oswald's built in the eleventh century, but badly restored; St. Margaret's, with considerable late Norman remains; St. Giles at the top of Gillesgate, built in 1112; and St. Mary-le-Bow with eighteenth-century screen and wainscotting. The two main bridges, Framwelgate and Elvet, both date from the twelfth century. The buildings at the S.E. end of the latter show traces of the chapel of St. Andrew which once stood there. Prohends Bridge was put up in 1771. From it the visitor has one of the best views of the picturesque banks which form a beautiful setting for the cathedral and the canons' houses. The view from South Street which stands on the opposite bank must be among the finest of its kind in Europe. Durham is rich in Georgian houses of which there are many in the N. and S. Baileys, in Old Elvet and in South Street. A number of them have fine staircases. Among the other interesting places is the café at No. 39 Silver Street, once the house of Sir John Duck, a seventeenth-century butcher's apprentice who made good; it has a particularly fine staircase. In the near neighbourhood are Kepier hospital, now a farm, founded in 1112 as a religious estab. and Sherburn hospital, a twelfth-century leper hospital; now, much altered, it is a combined hospital and almshouses. The site of the battle of Neville's Cross, where the Eng. defeated the Scots in 1346 is on the N. outskirts. The chief occupations are local gov., the distributive trades and coal-mining (though there are no pits in the immediate vicinity). The local

trades include a carpet factory, two organ factories and a sweet factory. Assizes and Quarter sessions are held here. The chief educational estab. include the univ. (*q.v.*), an old estab. public school for boys known as Durham School, a high school for girls, two grammar schools and various others. Pop. 16,200. See G. Home, *Durham Cathedral*, 1935; C. H. Cook, *Portrait of Durham Cathedral*, 1948.

Durham, c. seat of Durham co., N. Carolina, U.S.A., 25 m. N.W. of Raleigh, with a great trade in tobacco and manuf. of cigars and cigarettes, with one of the largest tobacco factories in the world. It has also large cotton and hosiery mills. It is the seat of Duke Univ., the North Carolina college for negroes and Lincoln hospital for negroes. Pop. 60,100.

Durham, or Shorthorn Breed, see under CATTLE.

Durham Light Infantry, formerly 68th and 106th regiments, linked in 1881 to form Durham Light Infantry. 68th formed in 1756 as 2nd Battalion, 23rd Regiment, but became 68th in 1758. Served mainly in France, West Indies and Gibraltar and joined Wellington's army in Peninsula in 1811. Later, served in N. America, Crimean War and Maori War in New Zealand (1864). The 106th Regiment was raised in India by the East India Co. in 1826 as 2nd Bombay European Regiment. Served in Scinde and Aden and in 1857 in Persian Expedition, and during the Indian Mutiny. After the mutiny it was transferred to the Brit. estab. as 106th Regiment and came to Eng. in 1871. Fought in Egyptian Campaign of 1884-5. The D. L. I. served in S. African Campaign of 1899-1902 and was in the Ladysmith relief column. During the 1914-18 War it raised some thirty-seven battalions which served in France, Flanders, Italy, Macedonia, Egypt, N.W. Frontier of India, and Archangel. The regiment also served in the Third Afghan War in 1919 against the ex-king Amanullah (*q.v.*). The D. L. I. fought on the W. Front and in Burma in the Second World War. The 10th and 11th Battalions were part of the 49th Territorial Div. and, together with the Tyneside Scottish and various Yorkshire units, they distinguished themselves in the battle of Normandy, in the capture of Rauray and Bayeux. One battalion was part of the garrison troops in the is. of Cos.

Durham Report, sequel to the rebellions in Canada of 1837-38. The rebellions failed because most Reformers, though bitterly opposed to 'Family Compact' rule (*i.e.* the rule of a small minority of wealthy and influential people) would not join an armed rising. But the Brit. Gov. nonetheless took prompt action by appointing the Earl of Durham (*q.v.*), one of England's foremost public figures to be governor-general of Canada with the mission of preparing recommendations for reforming the gov. of the Canadas so as to end the strife which for years had torn them into warring factions. Baffling problems awaited him: the assemblies of Upper and Lower Canada had

been suspended; numerous political prisoners filled the gaols; violence on the Amer. border threatened to flare up into actual warfare. Durham spent five months in Canada, mostly in Quebec, and through his staff, collected a great deal of information which he subsequently used in his R. On June 28 (1838) he freed all the political prisoners except a few, whom he banished to Bermuda; but in naming a particular place of exile he exceeded his powers and when the Brit. Gov. weakly disallowed his order, he resigned, to the great chagrin of the Canadian people with whom he was popular.

Gloom and disappointment would have marked the close of his mission had it not been for the R., on the preparation of which he expended intense energy. Two months after his return it was completed and laid before Parliament. It touched on all the provs., but paid most attention to conditions in the two Canadas. To end the crisis there, Durham put forward two prin. recommendations: the union of Upper and Lower Canada, and the introduction of Responsible Gov. He favoured union because the separation of the provs. since 1791 had caused many disputes and had made impossible, for example, the completion of the St. Lawrence Canals. Moreover he thought that conflict between Fr. and Eng. was the root of the trouble in Lower Canada and that union would resolve the difficulty by reducing the Fr. to a minority in the new gov. and assimilating them to the Eng. Canadians in language and laws. These views on the Fr.-Canadians are the least successful part of the D. R., though much of what Durham remarked here was well-founded, as for instance the Fr.-Canadian's lack of training in self-gov. But, as the future proved, the difficulties between the Fr. and Eng. Canadians could only be solved by developing co-operation and a sense of responsibility on both sides. The most important of the recommendations of the D. R. was Responsible Gov. on the model of the Brit. system of Cabinet Gov. adapted to colonial conditions. To avoid a clash between the Executive Council and the instructions sent to a governor, the R. proposed to limit the power of the colonial gov. to local affairs, in which the Brit. gov. had no desire to interfere. Four matters were to be kept under control of the imperial gov.: foreign affairs, the regulation of trade, land grants, and the form of gov. The distinction, however, of first advocating responsible gov. belongs to Robert Baldwin of Upper Canada, who had been urging it for some years. Baldwin wrote to Durham while he was in Canada and convinced the governor-general that responsible gov. would be effective. Durham's contribution, however, was equally essential; for by his R. he forced it on the attention of the Brit. gov. and people and thereby ensured that it would be given a trial. His other recommendations, if less important, were essential to his aims: to train people in democratic gov. he advocated the estab. of local and municipal govts. and elected councils. He also recommended the ex-

tension of education because 'general education was necessary to the estab. of a strong popular gov.' If the D. R. is not above criticism, its merits far outweigh its defects, and it is rightly regarded as one of the most important constitutional documents in the hist. of the Empire. For it upheld the ideal of colonial self-gov. as one to be cherished, not feared and suppressed. It pointed to the possibility of a strong Brit.-Amer. nation. To-day, for these reasons, the author of the R. is numbered among the founders of Canada. The Report was at once approved by the Home gov., but responsible gov. was not achieved immediately. The Family Compact groups were most hostile to it and many people on both sides of the Atlantic thought it was merely a step in the disintegration of the Empire. Almost ten years of political strife for Canadian Reformers passed before the nature of responsible Gov. was understood and the necessity for its full and free acceptance recognised. See G. W. Brown, *Building the Canadian Nation*, 1942; Sir R. Coupland, *The Durham Report*, 1945.

Durham University, opened in 1833. Archdeacon Thorp (d. 1862), who was largely responsible for the scheme for its erection drawn up by the chapter in 1831, was appointed the first warden. Univ. College and Bishop Hatfield's Hall, which was especially designed to give facilities for a univ. career to poorer students, are the chief residential estabs. Degrees are granted in music (since 1889) and hygiene, as well as in all the ordinary branches of learning. Women have been admitted as graduates since 1895. As early as 1300 there was a hall at Oxford reserved for Durham students.

Durian, genus of Bombacaceae, is indigenous to the Malay Archipelago. *D. zibethinus* is a large and lofty tree with smallish, alternate leaves, and yields the fruit known as durian. The durian is remarkable for the delicacy and richness of its flavour and the offensiveness of its odour, which has been compared with that of decaying onions.

Durlus, see **Douro**.

Dürkheim, grape-cure health resort with mineral springs, 6 m. S.W. of Mannheim, at the foot of the Hardt Mts., in the Rhineland-Palatinate, Germany. Pop., 9100.

Durlach, tn., Württemberg-Baden, 2½ m. from Karlsruhe to which it was joined in 1938. In 1565 a castle was built there, now used as a barracks. The manufs. are brushes, tobacco, beer, sewing-machines, bicycles, dental instruments, organ building. Pop. 18,700.

Durnstein, or **Durrenstein**, vil. beautifully situated on the l. b. of the Danube, 43 m. W.N.W. of Vienna, in Lower Austria. Close by are the ruins of the fortress in which Richard the Lion Heart was imprisoned (1192). Pop. 600.

Durostorum, see **SILISTRIA**.

Durra, or *Sorghum vulgare*, is a grass resembling Indian corn, much used for food in Africa, Asia, and India. The stem produces sugar, and the grain, fermented,

is made into alcoholic drinks. It is highly valued as a forage crop, as pasturage for sheep and all stock, and also as poultry food. When eaten green, sorghum has caused the death of animals, by reason of prussic acid found in the leaves. *Durrës*, see DURAZZO.

Durley, tn. of Gloucestershire, England, 5 m. S.W. of Gloucester. It was once famous for cloth manuf., but now its industry consists in manuf. of pins and agric. tools, incubators and cream-separators. The reformer Fox, bishop of Hereford, was born here in 1496. Pop. 3200.

Duruy, Jean Victor (1811-94), Fr. historian and statesman, sprang from the working-class. He passed with high distinction through the *École Normale Supérieure*, where he studied under Michelet, and having assisted the emperor, Napoleon III., in his *Vie de César*, was appointed, in 1863, minister of education. During his six years in office he modernised the curricula of lycées and colleges, instituted secondary education for girls, and founded the 'conferences publiques.' His *Histoire des Romains* (1879-85), is a splendid monument to his fame.

Duryea, anthracite mining bor. of Luzerne co., Pennsylvania, U.S.A. Pop. 8200.

Duse, Eleanora (1858-1924), It. actress, b. Oct. 3, at Vigevano; only child of Alessandro Vincenzo D., a Venetian actor (the son of the actor, Luigi D.). She was on the stage from childhood, and toured continually. During her first season of success at Naples, with *Les Fourchambault* by Augier, she was deserted by her lover, Martino Caffiero; and the boy to whom she gave birth at Turin lived for only a few days. In 1881, at Florence, she married Tebaldo Checchi, a fellow-actor. At the Carignano Theatre, Turin, she scored a success (immediately after a Bernhardt season) with *La Princesse de Bagdad* by Dumas fils. Later, she returned with her husband to Turin, where a daughter was born. The company visited S. America; and at Rio de Janeiro she separated from her husband on account of her passion for Flavio Ando, a young actor who had joined them. Checchi soon afterwards died in a consular post at Lisbon and left her a legacy. On return to Europe the company was disbanded; and she formed a new one, with Ando as its head. She began to tire of the old-fashioned Dumas plays, and came under the influence of Ibsen. She created the part of Santuzza in *Cavalleria Rusticana*. She rivalled Bernhardt in Paris in 1897. After her relations with Ando had cooled, she was associated for five years with D'Annunzio (q.v.) in an attempt to revive classicism in the It. theatre. Many of his plays were written for her. She played in such different rôles as Juliet, Francesca da Rimini, Marguerite, Camille, Fernando, Magda, Paula Tanqueray, and Ellida in Ibsen's *Lady from the Sea*. She would have nothing to do with make-up—relying on her natural liveliness of feature, voice, and gesture. She retired from the

stage in 1909. Owing to war losses, she returned to it in 1921, and repeated her triumphs in Italy, London, and America. She died of influenza at Pittsburgh, Pennsylvania. See E. A. Reinhardt, *Das Leben der Eleanora Duse*, 1930.

Dushambe, see STALINABAD.

Dussek, Jan Ladislav (1761-1812), Bohemian pianist and composer. He was an accomplished pianist at the age of 5 and an organist at 9. Was a choir boy at the convent of Jihlav, attended a Jesuit college and afterwards took his degree in philosophy at the univ. of Prague. For some time he supported himself as organist, and having made a name at Amsterdam as a pianist of remarkable virtuosity and delicacy of touch, he became prof. of music to the stadtholder at The Hague. Whether he played in Berlin, St. Petersburg, Milan, or London, he invariably attracted large audiences. His attempt to found a music-pub. business in London was a complete fiasco, and he was obliged to take refuge from his creditors in Hamburg. From 1809 till his death he directed the concerts of Prince Talleyrand in Paris. But he undermined his constitution by drinking heavily, in a vain effort to rouse himself from the excessive languor to which his obesity had reduced him. He wrote many pianoforte sonatas, trios, and quartets, etc., which have true melodic charm.

Düsseldorf, city on the r. b. of the Rhine in the Rhineland industrial dist. of Germany. Before the Second World War D. had 500,000 inhabs. and important iron and steel works. Between the two world wars it became the administrative cap. of the Ruhr and the leading commercial city of W. Germany. Nearly all the iron and steel heavy engineering and armaments plants of the Ruhr dist. had their head offices and administrative depts. there in an area which suffered severely in a single air raid by the R.A.F. on June 11, 1943. Its industries include cotton spinning and weaving, paper, silk, dyes, chemicals, and furniture, and the Rhine traffic in the harbour is considerable: the vol. of these industries has declined as a result of the war. The Academy of Art, founded here by the elector Charles Theodore in 1767, is an imposing Renaissance edifice of 1881, with a collection of Flemish and of 17th-century to eighteenth-century paintings and 11,000 drawings, the most important of which survived the bombardments of 1942-45. The municipal picture gallery of modern D. painters was in the Kunsthalle. There is also a museum of industrial art and a library of 100,000 vols. The other notable buildings include the Lambertuskirche, of the thirteenth century and the tn. hall of 1570-3. The poet Heine was born at 63 Bolkerstrasse, in 1797. Many of these features of the city have been damaged, although few are beyond repair. D. was occupied by the Fr. from March 1921 till Aug. 1925. The extensive Rhenish metal ware and machine factory, previously engaged in the production of heavy guns, changed over after 1921 to the making of locomotives and railway carriages. But

during the Nazi regime the prin. activity was the making of armaments, the largest war plant concern being the Rheinmetall-Borsig Factory, making guns, shells and other armaments; the Mannesmann-Rehren Werke, making iron and steel tubes, submarine mine cases and the like; and the J. G. Schwietzke Plant making torpedoes and torpedo tubes. It was therefore an important target for Brit. bombers. The first really severe raid was that of June 11, 1943, when a combined attack on D. and Münster was made by the R.A.F., some forty-three Brit. bombers being lost. In that raid extensive damage was caused and many factories which had been repaired after a much smaller raid in the summer of 1942 were again put out of action. All the main sheds in the Düsseldorf-Derendorf marshalling yard were burned out. On April 22, 1944, the R.A.F. delivered a heavy combined attack on D. and Brunswick, losing forty-two aircraft. On Nov. 1, 1944, the R.A.F. dropped over 4000 tons of bombs on D., losing twenty aircraft, but doing great damage. On April 3, 1945, the Gers. blew up the three bridges of D. to save the city from capture, but it fell to the Allies soon afterwards. *See further under RUHR, BATTLE OF THE; WESTERN FRONT IN SECOND WORLD WAR.*

Dust, small particles of earth, etc., which are moved by the slightest air-currents. Even in a room which has been kept spotlessly clean the existence of D. can be demonstrated when a strong beam of sunlight enters by a window. The D. of the atmosphere consists of tiny fragments of minerals, organic matter, carbon, and ash from burning substances, volcanic D., salt from sea-spray, and D. formed by the disintegration of meteors on their way through the atmosphere. D. was formerly considered a nuisance without any redeeming qualities, but J. Aitken, in 1880, demonstrated that it combined with its disadvantages sev. useful functions. When air containing water vapour is cooled to the point of saturation, the water vapour does not condense at once unless there is some solid substance for it to condense upon. Under suitable conditions of temperature the D. particles in the atmosphere become nuclei or centres for the condensation of water. These minute globules form clouds, mists, and fogs, and on coalescing form drops of rain. Aitken devised an instrument for counting the D. particles in a known volume of air. The results show that D. is more abundant than was suspected, the number of particles varying from 100 per c.c. in very clear air to about 100,000 per c.c. in the air of large cities. Many modifications of the sun's light are due to D. Without it we should have no twilight, no blue sky, no gorgeous sunsets, and none of the chiaroscuro effects which make scenery charming. On the other side of the account, D. presents to-day a most serious technical problem in many industries because of explosion risks and health hazards. In a certain mixture of air and suspended fine D., an explosion

of great violence may occur in the presence of a spark or flame, and preventive measures must be taken, e.g. in flour-mills, saw-mills and mines. More serious is the effect of D. on health: miners, particularly of anthracite, are susceptible to D. diseases but other industries are not without their dangers. It is the cause of various skin diseases, and of bronchial ailments in the cotton industry, with attendant risks of poisoning.

Dusuns, tribe of Brit. N. Borneo numbering 117,400 out of the total native pop. of 205,200 (1931).

Dutch Antilles, *see* WEST INDIES.

Dutch Art. The phrase here denotes the art of Holland produced from the end of the sixteenth century to about 1700. Much of the architecture and sculpture of the Low Countries was destroyed by protestant vandalism in the second half of the sixteenth century. At Amsterdam the Oude Kerk and the Nieuwe Kerk, and the church of St. Peter at Leyden all date from about 1300. The Groote Kerk at Rotterdam (1400); that of Haarlem (c. 1490); the Hague (1500); and St. Catherine's Cathedral at Utrecht (1524), are notable eccles. buildings. Civic architecture is represented by the great Stadhuis at Leyden (1580). It is interesting to recall that the domestic architecture of Holland was the basis of the charming style in which much of London was rebuilt after the fire of 1666. Examples of this influence may be seen in King's Bench Walk and New Square.

It is, however, the work of Dutch painters which must be considered among the glories of European civilisation; and throughout that work two themes predominate, Dutch home life and republican freedom. In the late sixteenth and early seventeenth centuries D. A. was influenced by It. renaissance and baroque art. Thus Cornelisz (1562-1638) tried to reproduce the style of Raphael, but without marked success. His 'Bacchus and Ceres' at Dresden, and 'Prodigal Son' at Budapest exemplify the motif of seduction in the guise of classical myth and moralistic art respectively. Abraham Bloemaert (c. 1565-1657) painted in the baroque style. He owed something to Titian as may be seen in his 'Shepherdess with Grapes' at Karlsruhe. His pupil Gerard van Honthorst (1590-1656) painted portraits of royal personages and other celebrated individuals. Those of Queen Elizabeth of Bohemia and George Villiers, first duke of Buckingham, are in the National Gallery, London. Jan van Goyen (1596-1656) was one of the founders of a school of painters specialising in picturesque naturalistic landscape. Among his most celebrated pupils was Nicholas Berchem (1624-83) whose 'Old Port of Genoa,' 'Jupiter with Nymphs on Ida,' and 'Musical Shepherdess' are in the Wallace Collection. Mention must be made of a distinct group of painters famous for their studies of lower and middle class life, emphasising particularly its gay and care-free aspect. The chief of these were Dirk Hals (c. 1589-1656) represented in the National Gallery, by his 'Prodigal

Son.' Adrian Brouwer (1608-40) whose tavern scenes are a reflection of his own somewhat dissolute life; Adrian van Ostade (1610-85) whose 'Alchemist' is in the National Gallery; and Jan Steen (1626-79), his pupil. Perhaps the most important of this school, however, was Jan Molenae (d. 1660), a pupil of Frans Hals. Besides tavern groups, he painted scenes from wealthy bourgeois life, and

'Young Woman in a Courtyard' and 'Peepshow Cabinet' (both in the National Gallery) by Samuel van Hoogstraten (1627-78). Pieter de Hooch (c. 1632-c. 1681) shows affinities with Vermeer. He chose mostly interiors illuminated by different lights, with the radiance of day pouring through open doors and windows. Three of his works are in the National Gallery.



W. F. Mansell

VERMEER'S 'LADY STANDING AT THE VIRGINALS'
National Gallery, London

his significance in the latter genre lies in the fact that such works as 'The Family Feast' at Amsterdam, and 'Musical Pastime' in the National Gallery were forerunners of the Dutch *tableaux de modes* which were later developed by Gabriel Metsu (1630-67) and Gerard Ter Borch (1617-81). The latter was a prolific artist who expended minute exactness upon details of dress and furniture. In portraiture he reveals the influence of Velasquez. The National Gallery possesses a splendid example of his work in 'The Peace of Munster' (see HOLLAND.—History). Yet another group of painters is remarkable for what has been called 'Architectural Art.' Handsome interiors are the features of such pictures as

Three names in D. A. tower above all others. Hals, Rembrandt, and Vermeer. Frans Hals (1580-1686) is one of the greatest portrait painters of all time, and as a colourist he had no superior in his age. He shows little trace of foreign influence and specialised in studies of laughing children and types of Haarlem low life. His most important works are the portrait groups of the Haarlem Civic Guards, and his 'Laughing Cavalier' in the Wallace Collection is justly one of the most celebrated pictures in the world.

Harmensz Rembrandt van Rijn or Ryn (1609-69) stands as one of the great geniuses of the race. From the first he was an ether of the highest skill and closely studied the it. masters in such

originals as he could buy. It has been said of his work that the form is never really the subject, but derives from the subject, and expresses his attitude of mind to that subject. Rembrandt has been called the artist of old age, and indeed his incomparable 'Head of an Old Woman' in the National Gallery is among the finest works in that collection. Also in the National Gallery are 'Christ before Pilate,' three self-portraits, 'Hendrickje Bathing,' and 'A Jewish Rabbi.'

Jan van der Meer, or Jan van Delft (1632-75), in his earlier period was influenced by the school of Rembrandt, but he later developed a less vigorous style, characterised by a delicate subtlety and harmony of treatment, and less bold colouring. To the first period belong 'Christ with Martha and Mary' (National Gallery of Scotland), and 'Woman and Soldier' (Dresden). Among later works are 'The Coquette' (Brunswick), 'Lady at a Casement' (New York), and 'Lady Standing at the Virginals' (National Gallery). His masterpiece is the 'View of Delft' (The Hague). Vermeer was almost forgotten for two centuries and many of his works were attributed to de Hooch and Ter Borch.

Magnificent examples of D. A. are to be found in all the prin. galleries of Europe and America, but the supreme collection is housed in the Rijksmuseum at Amsterdam. (See also under individual names.) See E. Fromentin, *Masters of Past Time* (trans.), 1912; H. B. Cotterill, *A History of Art, 1922-23*; R. H. Wilenski, *Introduction to Dutch Art, 1927*; E. A. J. Vermeulen, *Handboek tot de geschiedenis der Nederlandsche Bouwkunst, 1928-32*; S. Sitwell, *The Netherlands, 1918*.

Dutch Auction, an auction in which the article to be sold is first put up at the maximum price. If there is no offer, the price is then lowered by stages until a bid is made.

Dutch East India Company. This famous company was founded by Charter, dated March 20, 1602, by the union of a number of smaller trading companies and was given by the Dutch gov. the monopoly of the trade between the Strait of Magellan and the Cape of Good Hope, together with the right to enter into treaties and alliances in the name of the States-General and to set up factories. Like its Eng. counterpart, it was also empowered to build forts and to employ its own troops. In 1619 the company founded Batavia on the site of a native tu., and some three decades later was in possession of most of the chief commercial centres throughout the Indian Archipelago, such as Sumatra, Java, Ceylon, and Borneo, besides itself owning thriving colonies in S. Africa. It was not dissolved until 1798, when its possessions were assigned to the Dutch Gov. See F. Valentyn, *Beschryving van oost en nieuw Oost Indien* (Amsterdam), 1724.

Dutch East Indies, or Netherlands Indies, situated between 85° and 141° E. long. and 6° N. and 11° S. lat., form the Asiatic possessions of Holland, and, by the con-

stitution of 1922, are part of the Kingdom of the Netherlands. They include Java and Madura; the is. of Sumatra; the E. S., and W. of Borneo; Bali and Lombok; the Celebes; the Moluccas; Timor Archipelago; New Guinea to 141° E. long.; Bangka; Rian-Lingga Archipelago, and Billiton. These is. include thousands of small ones. They are controlled by a governor-general, who is assisted by a council of departmental heads. In 1918 a 'People's Council,' or Volksraad, was formed to act in an advisory capacity; of its members—European, native, and foreign Oriental—some were elected, some appointed by the gov. A further step towards self-gov. was made in 1927 when this Volksraad was made, in conjunction with the governor-general, the legislature for all matters of internal policy. The D. E. I. were invaded and controlled by the Jap. from 1941 to 1945; Netherlands authority was restored after their capitulation. But a revolutionary nationalist movement seized power from the Jap. on the is. of Java, Madura, and Sumatra, proclaiming an Indonesian Republic on Aug. 17, 1945, under the presidency of Dr. Soekarno. *De facto* recognition of the authority in these is. of the republic was given by the Netherlands States General on March 25, 1947. Madura was recognised as an autonomous state in Feb. 1948, and W. Java in March 1948 under the name of Negara Pascoendan. A provisional federal gov. for the whole Indonesian Union was set up also in March 1948. In this Union the Kingdom of the Netherlands and the former D. E. I. are equally sovereign partners. (See further under JAVA; INDONESIA.) The bulk of the native pop. is Mohammedan in religion, but the is. enjoy complete religious toleration. There are many public schools, both primary and secondary, also private schools and training schools, Dutch being the language of instruction. There are 4611 m. of railway, in Java and Sumatra. Jogjakarta, is the cap. of the Indonesian Republic. Rice, maize, cotton, sugar, coffee, cinchona, rubber, tea, potatoes, cassava, groundnuts, soya beans, and tobacco are cultivated, sugar, rubber, tea, tobacco and cinchona being the chief exports. Both tin and coal are mined, and increasing quantities of mineral oil are obtained annually. In 1910 the value of imports was £10,904,153 and exports £82,545,700. The total area is 735,263 sq. m., and the pop. approximately (1930) 60,727,000. Java is the most densely populated of the is., being in some dists. over-populated, and efforts have been made to persuade the Javanese to emigrate to S. Sumatra and other more sparsely peopled parts. The Dutch E. India Co., founded in 1602, ruled the is. from that date until 1798, when the company was dissolved. See G. T. Raynal, *Histoire philosophique et politique des établissements et du commerce, des européens dans les deux Indes, 1780*; D. J. H. Nysson, *The Races of Java, 1929*; E. S. de Klerck, *History of the Netherlands East Indies, 1938*; J. W. Nyssrom, *Surinam, 1942*; A. Hyma, *The Dutch in the Far*

East, 1942; H. J. van Mook, *The Netherlands East Indies and Japan, 1944*; J. S. Furnival, *Colonial Policy and Practice: a Comparative Study of Burma and Netherlands India, 1948*; D. Wehl, *The Birth of Indonesia, 1948*.

Dutch Guiana or Surinam, Dutch colonial dependency, on the N. coast of S. America between lat. 2° and 6° N. and long. 53° 50' and 58° 20' E., has an area of 55,143 sq. m. and a pop. of 203,500. It is bounded on

direction, because the ocean currents sweeping W. from the Amazon have deposited silt at their mouths and thereby considerably enlarged the original land area. A few m. from the coast there is a narrow zone of savannahs, and beyond, drained in part by the upper reaches of the Marowijne and the Nickeri, the unrelieved jungle stretching to the frontier of Brazil. Much of this jungle is uninhabited or only sparsely populated by



Royal Netherlands Embassy

DUTCH GUIANA: NATIVE TRANSPORT ON THE RIVER ABOVE MAMADAM

the E. by the R. Marowijne, which separates it from Fr. Guiana, on the W. by the Corentyne (or Corantijn), which divides it from Brit. Guiana, and on the S. by dense forests. The New R., which was at first assumed to be a trib., was subsequently proved to be larger than the upper Corentyne, and the ownership of the triangular area between the two rvs. has never been definitely determined; but the boundary is commonly taken to be the Upper Corentyne or Coeroeni R., and the Dutch may well lose the ter. by default, which would be no great loss unless what is at present thought to be only uninhabited and inaccessible jungle proves to have useful resources. The general direction of the rvs. in the interior is from S. to N., but near the coast most flow in a westerly

direction, because the ocean currents sweeping W. from the Amazon have deposited silt at their mouths and thereby considerably enlarged the original land area.

A few m. from the coast there is a narrow zone of savannahs, and beyond, drained in part by the upper reaches of the Marowijne and the Nickeri, the unrelieved jungle stretching to the frontier of Brazil. Much of this jungle is uninhabited or only sparsely populated by nomadic Indians—who hunt, fish, and grow manioc and cassava—or by Bush Negroes. Seven-eighths of the pop. of D. G. is in the narrow coastal belt into which all the agriculture and industry of the colony is concentrated: of these about one-third lives in the cap., Paramaribo. Most of the country is covered by dense jungle in which only the 'Amerindians' and Bush negroes, descendants of runaway slaves, live. The Amerindian pop. numbers only 2000 and each year diminishes, but the Bush negroes are increasing and now number nearly 20,000. The Saramaccaners form the largest tribe numbering twice as many as the others together. They live in the region between the Surinam R. at Kabel Station to its confluence with the Gran Rio and Pikien Rio.

The Aucaners of the upper Commewijne and Marowijne rivs. are the only other important tribe. The cultural influences of these tribes borrowing a common origin in Africa as well as during the days of slavery in the Caribbean, their language, religion, and art differ only slightly to-day, and indeed their present civilisation is said by anthropologists to be practically identical with that of Africa of the seventeenth century. Bush negro vills. have streets of hard packed earth, fringed by groups of palm-thatched huts with roofs sloping almost to the ground, the walls being of woven palm fronds. At the head of each tribe is a *granman* (great man) appointed by the governor of D. G. and under the *granman* are vil. *captains*, but the real power is in the hands of family groups. Clothing is simple—the men wear a *camissa* or a toga-like garment looking like a patch-work quilt, and the women a *pangl* or cloth round the torso. Cicatrization is a common form of decoration. Both the Saramaccaners and Aucaners let their hair grow long and braid it in fanciful designs. The Bush negroes live by hunting, fishing, and agric. and hunt with bows and arrows unless they can procure firearms. Their crops include yams, bitter cassava, peanuts, maize, dry rice, and a little sugar-cane. A serious crop pest is the umbrella or leaf-cutting ant which attacks newly-planted fields and old too if adjacent to the new. Among the Bush negroes there is still a belief in witchcraft and charms, but the more extreme manifestations of African superstition and orgies are absent. Surinam was the original home of the Arawaks, the most civilised of the Guiana Indians. They were peaceful agric. and proficient workers in stone. The Caribs, though originally living in the heart of the continent, at some early period migrated to Guiana and to the region lying around the lower Orinoco, and they became the traditional enemies of the Arawaks. The latter numbering about 1200 and the Caribs 1000 form four-fifths of the present Indian pop. of D. G. All the Guiana Indians live in much the same state as they did when the country was first explored. The women have been far less affected by civilisation than the men, which is natural because their work—agric., cooking, and childbearing—have not lessened in importance. The prin. agric. industries are sugar and rice. Liberian coffee and cacao are also cultivated. Gold is found in the interior and the forests yield balata among other products. Bauxite (1,020,000 metric tons in 1946) is also an important product. The plantations lie along the lower courses of the Surinam and Saramacca and also in the low-lying coastal regions, and the chief settlements are among these plantations. These settlements are inhabited by Javanese, Chinese, Coolies, Negroes and about 2000 whites. The total pop. according to religions is: Netherlands Reformed and Lutheran, 13,900; Moravian Brethren, 34,700; Rom. Catholic 34,500; Jews, 900 (all these totals include Europeans and Natives); Moslems

(Brit. Indians and Indoneses), 55,500; Hindus, 33,700; Confucianists, 1600; and others 2800. The average temp. from Dec. to March is 80° F. The nights are cool and health conditions are favourable.

The gov. of D. G. is administered by a governor and an advisory council all the members of which are nominated by the Queen of the Netherlands. The legislative body is called the Colonial States, whose members sit for six years. Paramaribo, the chief tn., is situated on a shell reef on the W. bank of the Surinam about 14 m. above its estuary. It is a sprawling tn. that is evidently Dutch in character, intersected by canals and with a diked countryside near at hand. Many of the tn.'s streets are lined with mahogany, flamboyant and tamarind trees and royal palms. The houses are mostly multi-storied buildings of wood with shutters against the heat. The hub of official life is the Gouvernementsplein. To the N.E. of this square is the governor's residence and to the N.W. a few lovely mellow brick buildings recalling the Dutch colonial architecture of New England. Beyond the Gouvernementsplein lies Fort Zeelandia, which formerly stood guard over the city. Of the smaller tns. Nieuw Amsterdam, close to the cap., is the administrative centre of the Commewijne dist., once important it is now deserted. Nieuw Nickerie, second tn. of D. G., is the centre of an important rice-growing dist. largely populated by Javanese and Brit. Indians (pop. 4000). Coronie is surrounded by great swamps but a new road to Paramaribo has lessened its isolation, which, however, accounted for much of its charm, for this tn. has a very old-world atmosphere with its single long avenue lined with coconut palms. Its many old graves testify to the fact that it was colonised by the Scots during the eighteenth century. Albani is a dreary little frontier tn. 18 m. above the mouth of the Marowijne R. The first attempt at the settlement of D. G. was made in 1630 by Capt. Marshall, an Englishman. In 1644 some Dutch and Portuguese Jews from Brazil introduced sugar cultivation, but it was not until 1650 that a permanent settlement was effected by the famous Francis, Lord Willoughby of Parham (see under BARBADOS). In 1666 the colony capitulated to the Dutch, and by the Peace of Breda in 1667 it was ceded to the Netherlands in exchange for New Amsterdam, now New York, which became a Brit. Possession. Thereafter Surinam was twice in the possession of England, from 1799 to 1802, and from 1804 to 1816, when it was finally handed back to the Dutch. See W. H. Brett, *The Indian tribes of Guiana: their condition and habits*, 1868; G. Palgrave, *Dutch Guiana*, 1876; W. E. Roth, *An inquiry into the animism and folk-lore of the Guiana Indians*; J. Rodway, *Guiana, British, Dutch, and French*, 1921; M. J. and F. S. Herskovits, *Rebel destiny. Among the Bush-Negroes of Dutch Guiana*, 1934; F. H. Hiss, *Netherlands America*, 1934; Dutchman's Breeches, see DIENTRA. Dutch New Guinea, see NEW GUINEA.

Dutens, Joseph Michel (1763-1818), Fr. engineer, was appointed chief engineer of the dept. of Lëman in 1803, and assisted in constructing the railway via the Simplon Pass. His *Mémoires sur les Travaux publics de l'Angleterre* (1819) was the fruits of his appointment to study the inland navigation of that country.

• **Du Toit's Pan**, see under DIAMOND.

Dutt, Romes Chandra (1848-1909), Indian writer and civil servant, was a native of Calcutta, and was educated at Presidency College before he came to England and studied at Univ. College, London. Having passed with the highest distinction into the Indian Civil Service (1871), he was appointed divisional commissioner in 1891 and 1895, being the first Indian to receive so high a post. In 1897 he retired from the service, and from 1904 to 1906 acted as revenue minister of the Baroda state. He wrote on the economic hist. of his country from 1757 until 1900, trans. Sanskrit writings into Eng. verse, including the *Mahabharata* (1898) and the *Ramayana* (1900), and pub. many novels in his native Bengali. See life by J. N. Gupta, 1911.

Dutt, Toru or Tarulata (1856-77), Hindu author, was a Christian girl of Calcutta, who, like Marie Bashkirtseff, developed in her girlhood a literary genius which showed small sign of immaturity. For over three years (1869-73) she was abroad in France and England. Her *A Sheaf Gleaned in French Fields* (1876) contains Eng. versions of Fr. poems, and she also trans. into Eng. passages from the Sanskrit *Vishnupurana*. Sir E. Gosse ed. her *Ancient Ballads and Legends of Hindustan* (1882).

Dutt, William Alfred (1870-1939), Eng. author and journalist, b. in Norfolk. He was educated at Bungay Grammar School. It was on the staff of the *Eastern Daily Press* that he received most of his journalistic training, and he was assistant editor of the literary department of the National Press Agency. He pub. *George Borrow in East Anglia* (1896), *Highways and Byways in East Anglia* (1901), *The Norfolk Broads* (1923), *The King's Homeland* (1904), *Wild Life in East Anglia* (1908), and *The Norfolk and Suffolk Coast* (1909).

Duty, see EXCISE and CUSTOMS DUTIES.

Duumviri, name applied in the republic of Rome to a magistracy of two: 1. *Duumviri Sacrorum* were the first two men to whom was entrusted the charge of the Sibylline books. 2. *Duumviri navales*, were specially elected for the purpose of equipping or recruiting the navy. 3. *Duumviri Jure Dicendo* were men with the highest judiciary powers in municipal tns. 4. *Duumviri Æde Dedicandæ* were elected for the purpose of dedicating a temple. 5. *Duumviri Perduellionis* tried those accused of treason. The office was created by Tullius Hostilius, but was afterwards abolished.

Duval, Claude (1643-70), highwayman, was a native of Normandy, and came over to England as servant to the duke of Richmond. Eventually he was hanged for his crimes, but his epitaph in Covent

Garden church, London, duly records his gallantries:

• Here lies Du Vall: Reader, if male thou art,

Look to thy purse: if female to thy heart.

Duveyrier, Henri (1840-92), Fr. traveller, b. at Paris, studied Arabic, and from 1857 to 1862 explored the Sahara, and lived for sev. months with the Tuareg, whose manners and speech he described in his *Exploration du Sahara: les Touareg du Nord* (1861). He also interested himself in the 'shats' of Algeria and Tunis. In 1881 he pub. *La Tunisie*.

Dux, or **Duěcov**, tn. at the S. base of the Erzebirgo, 4½ m. S.W. by W. of Teplice in Czechoslovakia with manufs. of glass, porcelain, and metal goods. There are lignite mines close by. Pop. 13,000.

Duxbury, city of Plymouth co., Massachusetts, U.S.A., on Duxbury Bay, 24 m. E.N.E. of Taunton. The cable line laid across the Atlantic in 1869 from Brest, France, terminates here. In 1872 an imposing monument was erected on Captain's Hill to Miles Standish, one of the first settlers in 1631. The house of his son Alex Standish, built in 1666, is still standing. Pop. 1700.

Duyt, see DOIT.

Duze, FRANCE, see DIEUZE.

Dvina, or **Dvina**: (1) The N., or Syevernaya D., a riv. of N. Russia. It waters the Regions of Vologda and Archangel, drains an area of 136,000 sq. m., is 760 m. long, including the Sukhona, and is free from ice for six months of the year. Its source is traced from the confluence of the Sukhona and Jug, and after traversing a broad flat country it enters the Gulf of Archangel in the White Sea by three mouths. The chief tribs. are the Vychegda (625 m. long) and the Pinega on the r. b., and the Vaga on the l. b. Considerable merchandise is shipped down this waterway. In 1919 it was the centre of operations by the forces of Gen. Ironside against the Bolsheviks, whose troops, together with those of Gen. Maynard at Murnansk, were evacuated in the spring of the same year by the N. Russian Relief Force under Gen. Rawlinson.

(2) The W. D. or Duna. It rises in the Kalinin Region U.S.S.R. on the Valdai Plateau, has a basin of 33,000 sq. m., is about 600 m. long, and is provided with excellent canal connections which augment its commercial importance. Vitebsk and Daugavpils (Dvinsk) and Riga in Latvia, are situated on its banks. After receiving many tribs., it empties itself into the Gulf of Riga. During the First World War, the D. It. was an effective barrier against Ger. offensives intended to envelop the Russian right flank. The Gers. did not make any very serious attempt to break through at this point until the summer of 1915. They were supported by their fleet, which, however, was defeated by the Russian fleet, supported by Brit. submarines. Gen. von Below, who was in supreme command of the Ger. forces in this region, endeavoured to offset the naval defeat with a victory on land, and to this end he

organised offensives against Lennvaden and Friedrichstadt (Jaun Jelgava), from which the Russians withdrew after having destroyed the bridges. Another offensive was directed against Jakobstadt (Jakabpils), where the railway crosses the D. But here the Russians fought stubbornly and brought the offensive to a standstill by the end of the first week in Sept. Beyond a small Russian offensive in Feb. 1916, which had for its object the prevention of Ger. troops being sent further S., the region was quiet until the following June, when a Ger. offensive failed. In July 1916 a Russian counter-offensive overwhelmed the Gers. to a depth of 10 m. In the Second World War, a Ger. force crossed the D. in July 1941 at Jakabpils, took Ostrov and reached the main Russian defences on the way to Leningrad. There was again fighting. The position of Smolensk, pivot of the whole Ger. position in this region in 1943 covering the gap between the D., and the Dnieper, involved further battles in the region during the Russian counter-offensives of 1943.

Dvinsk, see DAUGAVPILS.

Dvořák, Antonín (1841-1904), a Bohemian musical composer, b. of humble parents at Nelahozeves (Mühlhausen). Destined at first to be a butcher, but his remarkable talent for music so attracted the attention of his first teacher that he was sent to the organ school of the Gesellschaft der Kirchenmusik in 1857. Joined the orchestral band of the Bohemian Interimstheater at Prague in 1862, and eleven years later became organist of the church of St. Adalbert in that town. During this time he wrote many songs, overtures and symphonies, and in 1874 produced his opera, *König und Köhler*, which was not a success; and composed diligently in this period when he was, for a time, under the strong influence of Wagner. His first success came in 1873, his *Hymnus* with text by Halek being well received by the Bohemian public. Then, through the influence of Brahms, Vienna became interested in his work, and after the pub., in Vienna, of his *Moravian Dances* and particularly his *Slav Dances* (1878), his fame spread into most countries. He was appointed director of the National Conservatory of Music in New York (1892-95), and in 1901 director of the Prague Conservatory. The most successful of his choral works produced in England was *Stabat Mater* (1883). Visited England sev. times up to 1887, conducting *The Spectre's Bride*, the *Requiem* and *St. Ludmila*. After his appointment in New York, the melody and rhythmic structure of his work show the influence of negro folk-music. In his later years he somewhat eschewed symphony and chamber music for opera and symphonic poems. D. had great creative power; 'intellectual control' is subordinated to elemental expression. At times a certain melancholy and religious fervour characterise his work, which shows a very wide range. He is often compared with Smetana, for both represent in modern Czech music the typically

national-classical generation. Other well-known works of his are the cantata, *The Spectre's Bride* (1885); the oratorio, *St. Ludmila*; *Slavische Tänze*, a composition for two pianos; and the symphonies in D minor, E minor (The New World Symphony), F, and G. See W. H. Hadow, *Studies in Modern Music*, 1908;



ANTONIN DVOŘÁK

E.N.A.

V. Fische (ed.), *Antonín Dvořák. His Achievement*, 1943; A. Robertson, *Dvořák* (Master Musicians), 1944.

Dvur Kralove (Ger. *Königinhof*), town of Czechoslovakia, on the l. b. of the Elbe, 70 m. N.E. of Prague. It has cotton and linen manufs. Here, in 1817, were discovered the famous Knighthof MSS., and in 1866 the Prussians defeated the Austrians here. Pop. 13,000.

Dwale, see BELLADONNA.

Dwarf (from A.-S. *deorg*), an individual considerably below normal size. The causes of dwarfism are somewhat obscure; in most cases heredity plays an important part and the general diminutiveness of all the structures is not readily explainable by any known defect in the nutritional conditions of the embryo. A distinction should be drawn between pygmies, where small stature is normal to the race, and individuals who fall considerably short of the size of their parents. True Ds. should further be distinguished from rickety Ds., where the deficiency is not general, but can be attributed to a more or less local condition. Such cases usually exhibit a bent spine and misshapen lower limbs, while the head and other structures may be of normal size, the

effect of the whole being as a result grotesque. Even the true Ds. are found to possess heads and chests large in proportion, though many famous Ds. are said to have presented in miniature the proportions of a well-built normal man. While giants are often constitutionally feeble, the dwarf condition is not usually accompanied by other physical and mental defects, except that very diminutive individuals are not uncommonly sterile, even when mated with individuals of similar proportions. Ds. are usually robust, free from disease, long-lived, and of ordinary or even superior mental endowment.

Famous dwarfs.—Owing to their dainty appearance and lively intelligence, Ds. have often been the favourite attendants of persons of high position, and hist. records many instances of the high value set upon diminutive persons by wealthy European and Oriental monarchs. The



E. N. A.

THE WEDDING GROUP: GENERAL TOM THUMB AND LAVINIA WARREN

Egyptian Pharaohs undoubtedly used members of the dwarf tribes of equatorial Africa as court attendants. It is also recorded that Ptolemy Philadelphus had as tutor the poet Philetas of Cos, who was said to be so small that he had to wear leaden weights to avoid being blown away. Julia, niece of Augustus, had two Ds., Coropas and Andromeda, each of whom was 2 ft. 4 in. in height. Mary I. of England had a page named John Jarvis who was 2 ft. high. A fair amount of information is obtainable concerning the life of Jeffery Hudson, who was born of normal parents in 1619 at Oakham in Rutlandshire. At nine years of age he was 18 in. high and well proportioned in every way. He was introduced to Charles I. and his queen in a pie which was brought to the dinner table, and was adopted into the service of the royal family. He became a soldier in the Royalist cause, and is said to have fought two duels, one with a turkey-cock and one with a full-sized antagonist, whom he shot dead. At thirty years of age he was 3 ft. 9 in. high,

having grown, so he announced, during his imprisonment by Turkish pirates, who ill-treated him. He died in 1682 at the age of sixty-three. Queen Henrietta Maria also had two Ds., Richard and Anne Gibson, who were married at the instance of the queen and had children of normal size. Of continental Ds., the chief are Béhé, the favourite of Stanislas, King of Poland, who was 2 ft. 9 in. high, and Richebourg, who was only 1 ft. 11 in. high; he died in 1858 at the age of ninety. In the nineteenth century many Ds. were publicly exhibited in England. The Pole, Borulwaski, was 3 ft. 3 in. high when full grown; he died in 1837 at the age of ninety-eight. Charles Stratton, popularly known as General Tom Thumb, was exhibited in London in 1844 and 1857. He was 2 ft. 7 in. high, and married another D., Lavinia Warren, in 1863; he died in 1883. Other exhibited Ds. were: Don Francisco Hidalgo, 2 ft. 5 in.; Jan Han-nema, 2 ft. 4 in., the so-called Aztecs, who appeared in 1853; and the Chinese D., Che-mah, who measured 2 ft. 1 in.

The Dwarf in Mythology.—The folk tales of most countries include accounts of diminutive people, usually with superhuman attributes. It has been suggested that such accounts have their origin in the existence of pygmy races in Europe in the Neolithic period, but the widespread nature of the fairy legend hardly needs such explanation. The fairy is by no means always pictured as of diminutive size. The true fairy, or invisible spirit, is probably a little person simply in order to explain the difficulty of seeing him. It is otherwise, however, with the D. of Teutonic legend. These are people of grotesque appearance, often malicious and of marvellous cunning in the working of metals. They possess in an exaggerated form the characteristics of many individuals of stunted growth; a disinclination for human society, great strength of arm and hand, shrewdness above the ordinary, a tendency to revenge for fancied slights, but a capacity for great devotion where their affections are engaged. Ds. amongst the ignorant and superstitious have been credited with supernatural powers, especially those individuals who are deformed. For dwarf races, see PYGMIES. See W. Bodin and B. Hershey, *World of Midgats*, 1935.

Dwarfing Trees, art introduced some centuries ago by the Japs. The tiny trees have all the appearance and characteristics in miniature of the same species growing freely in the open; they sometimes live as long as 250 years. They are best grown from seed, and the treatment consists of frequent pruning of shoot and root, twisting and bending of the branches, insufficient nourishment, the use of small pots so as to confine the roots and anything which can paralyse vitality without actually killing the plant.

Dwarka, maritime tn., Gujarat, India, in the W. of the Kathiawar Peninsula, Bombay. By the seashore stands the great temple of Krishna, with a pyramid 140 ft. in height, which is annually visited by 10,000 pilgrims. Pop. about 5000.

Dwight, Timothy William (1752-1817), Amer. author and divine, graduated at Yale College, 1769. During the War of Independence he served as an army chaplain, and wrote *Columbia*, a fine battle song. His books show a great diversity of interest. Southey believed that posterity would best esteem his *Travels in New England and New York* (1821-22) because of the light they throw on contemporary social and economic conditions; his sermons, entitled *Theology Explained and Defended* (1819), enjoyed for many years a conspicuous popularity.

Dwina, see DVINA.

Dwygtylchi, par. of N. Wales, in Carnarvonshire, 3 m. from Conway. Pop. 4500.

Dyaks, or Dayaks, certain tribes inhabiting Borneo. They may belong to the same race as the Malays. Sea Ds. or Ibans are the most numerous of the races of Sarawak. In 1940 the census showed 52,759 men, 57,101 women and 57,712



DYAK WARRIOR

E.N.A.

children, a total of 167,572. There is much conjecture as to the origin of these people, but it is certain that they are not indigenous to the country. They are most numerous in Sarawak and Labuan and from there have spread to Brunei and to North Borneo, in recent years. The Ibans are a vigorous healthy race who dwell in long houses containing as many as 40 families. They have little native culture but are quick to learn, and have borrowed customs and ideas freely from many races, including Europeans, with whom they have come in contact. Normally they plant hill padi, felling large areas of jungle for the purpose, but in recent years they have adopted irrigation and, especially, in the Kanowit Dist., have

been very successful. They own large areas of rubber and being of a thrifty nature, some of them are men of considerable wealth. Land Ds. in 1940 numbered about 37,000, and are only found in Sarawak. Their origin is obscure, but it is of interest to note that relics of Hindu culture have been found in the Samarahan and that some Land D. tribes, alone of the inhab. of Borneo, burn their dead. They are a peaceful people and for many years were oppressed by the Brunei nobles and raided by the Sea Ds., and it was their pitiful state that first roused the sympathies of Sir James Brooke. The Ds. are slightly built, and in colour lighter than a typical Malay. They are very strenuous and persistent workers and have a cheerful disposition. Their chief industries are weaving and spinning, dyeing, manuf. iron and steel implements. Their former practice of head-hunting is now unknown. In warfare their chief weapons were the blowpipe and a long spear or a curved sword. See C. Bode, *Head-hunters of Borneo*, 1882; H. L. Roth, *The Natives of Sarawak and British North Borneo*, 1896; W. O. Krohn, *In Borneo Jungles*, 1927; T. Harrison (ed.), *Borneo Jungle; An Account of the Oxford Expedition to Sarawak*, 1938; Agnes Keith, *Land Below the Wind*, 1939.

Dyas, see PERMAN.

Dyblö, see DÜPPEL.

Dyce, Alexander (1798-1869), eminent Eng. critic and scholar, b. at Edinburgh, educated at Edinburgh High School, and graduated at Exeter College, Oxford. He entered holy orders, but in 1825 settled in London and devoted his time to literature. His first pub. was *Select Translations from Quintus Smyrnaeus* (1821). He is famous for his annotated eds. of the early dramatists and poets, which include Peele (1823-39), Webster (1830), Greene (1831), Middleton (1840), Beaumont and Fletcher (1843-46), and Marlowe (1850). His scholarly ed. of Shakespeare, pub. in 9 vols. (1857), has not been surpassed. D. also edited the poems of Shakespeare, Pope, Akenside, and Beattie, and the critical and theological works of Richard Bentley. With Collier, Halliwell, and Wright, he founded the Percy Society, and for the Shakespeare Society pub. two early plays which he had discovered, namely, *Timon* and *Sir Thomas More*. His *Recollections of the Table Talk of Samuel Rogers* (1856) must also be mentioned. He attacked Payne Collier's ed. of Shakespeare in *Remarks on Mr. J. P. Collier's and Mr. Charles Knight's Editions of Shakespeare* (1844), and *Strictures on Mr. Collier's New Edition of Shakespeare* (1859), which cost him his friendship with his fellow writer. D. left his valuable library, which contained many rare books, to the S. Kensington Museum, London. In the *Catalogue*, pub. in 1875, is a 'Biographical Sketch', by John Forster.

Dyce, William (1806-64), Brit. artist, b. at Aberdeen. His most famous scriptural paintings were a 'Madonna and Child,' and 'Joshua shooting the Arrow of Deliverance'; some of his classical pic-

tures also are of great merit, but his finest and best-known works are the Arthurian frescoes in the robing-room of the House of Lords.

Dyck, Sir Anthonis (Antony) Van see VAN DYCK.

Dyer, Sir Edward (d. 1607). Eng. poet and courtier, b. at Sharpsham Park, Dorset. After studying at Oxford he travelled awhile, and then entered the court of Elizabeth, who employed him on sev. embassies. He, Sir Philip Sidney, and Fulke Greville were intimate friends from boyhood, Sidney himself writing of their having 'one mind in bodies three.' D. and Greville were chief pall-bearers at Sir Philip's funeral. Spenser speaks highly of D. as a poet, but only one of his songs is now generally remembered, *My Mind to me a Kingdom is*. His verse and prose writings were collected by A. B. Grosart (1872). See R. M. Sargent, *At the Court of Queen Elizabeth: the Life and Lyrics of Sir Edward Dyer*, 1935.

Dyer, George (1735-1841). Eng. author, b. in London, educated at Christ's Hospital and Cambridge. Besides writing a *History of Cambridge University* and other vols., he assisted in the preparation of Valpy's ed. of the classics (141 vols.), ruining his eyesight in the work. His friend Charles Lamb speaks of him very tenderly in his essays, *Orford in the Vacation*, and *Amicus Redivivus*.

Dyer, John (c. 1700-58). Brit. poet, spent some months sketching and painting in S. Wales. *Grongar Hill* (1726), which describes his native scenery of Towry, secured instant renown. The impressions of his tour in Italy are expressed in his *Ruins of Rome* (1740), which is more readable to-day than his didactic epic on sheep and wool, entitled *The Fleece* (1757).

Dyer, Reginald Edward Harry (1864-1927). Brit. soldier, b. Oct. 9, at Simla, India; son of Edward Dyer, a brewer. Educated at Middleton College, co. Cork. Commissioned in W. Surrey Regt., 1885 and transferred later to the 25th Panjabis of Indian army. He served in the Burma campaign of 1886-87, and the Zakka Khel expedition of 1908. In the First World War he commanded 45th infantry brigade on the E. Persia border. Brigade-Commander at Jalandhar, 1919, he was sent by the viceroy in April of that year to Amritsar, where rebellion was strongest. Here he pursued a policy of terrorism (see AMRITSAR) of which particulars became known only gradually; D. was appointed in May to command on frontier. An inquiry at Lahore, Nov. 1919, at which D. gave evidence, resulted in his being directed to resign. He afterwards dabbled in science, and was inventor of a range-finder. Wrote *The Raiders of the Sarhad* (1921).

Dyer, Thomas Henry (1804-88). Eng. historian and antiquarian, b. in London. His chief historical works are, *Life of Calvin* (1850), *History of Modern Europe* (1861-4), and sev. vols. on Rom. hist., which have been severely handled by critics. His antiquarian books on Pompeii and Athens have met with greater approval.

Dyer Sir William Turner Thiselton- (1843-1928). Eng. botanist, b. at Westminster. Prof. of natural hist. at R.A.C., Cirencester, 1868; prof. of botany, Royal College of Science, Ireland, 1870; assistant director at Kew Gardens, 1875; and director, 1885-1905. He also acted as Brit. Commissioner at sev. great exhibitions—Melbourne, Paris, and St. Louis. He ed. the Eng. ed. of Sachs's *Text-book of Botany* (1875) also *Flora Capensis*, and *Flora of South Africa*. He was vice-president of the Royal Society from 1896 to 1897, and was made K.C.M.G. in 1899.

Dyersburg, city of N.W. Tennessee, co. seat Dyer co., with flour and saw mills, cotton gins and textile mills, etc. Pop. 10,000.

Dyer's Rocket, see WELD.

Dyes and Dyeing, art of colouring fabrics, textile or otherwise, in such a way that the colour is evenly distributed and is difficult to remove. D. is in common use with wool, silk and leather, which are animal in origin, and with cotton, jute, linen, etc., which come from the vegetable world. It is an old art practised by E. peoples from time immemorial. Thus there is mention in the Book of Exodus of 'blue and purple and scarlet,' and it is believed that the Tyrian dyes were discovered by the Phœnicians as far back as 1000 B.C. It is this purple, which was manu. at Tyre, Tarsus, and Alexandria, that is constantly referred to, not only in the O.T., when the prophets speak of the purple-dyed vestments of the priests, but in the works of Homer, Strabo, and Herodotus, and indeed the one D. process described at any length by the natural historian, Pliny, is that of obtaining the same Tyrian dyes. Thus from the account of Pliny certain shell fish have been made by moderns to yield the royal colour over again. Other evidence that D. was one of the primitive arts is offered by blue and fawn, and reddish pieces of mummy cloth discovered by Egyptologists, whilst coloured church vestments that are still preserved clearly show that D. was practised with considerable success in the twelfth and thirteenth centuries.

Cotton and Linen are composed of fibres essentially of cellulose, which are susceptible to strong acids and alkalis, but dilute alkalis and weak acid solutions have little effect.

Wool contains sulphur and has basic properties. Alkalis and strong acids tend to destroy it.

Silk resembles wool in some ways, but is more resistant to acids and alkalis.

Jute contains cellulose and a tannin combined.

Artificial silk is of various kinds, such as rayon (including viscose, decomposed nitrocellulose and cuprammonium types), which is essentially cellulose, a cellulose acetate type, which is no longer composed of cellulose, but of the compound cellulose acetate; and nylon. Each type presents its own problems to the dyer, and much research was, for example, necessary before dyes suitable for nylon were

elaborated. The same is true of the new plastic fibre terylon.

Unions, e.g. fabrics made of more than one of the above.

The prime necessities of a good dye are, of course, that it is both permanent and even—two qualities which it is by no means easy to obtain. Thus, the simplest process affords hardly any safe dyes. This method may be briefly described as submersion of the fabric to be dyed in a bath of the colouring matter. Hardly any natural dyes are effective when so used, but good results are obtained by bringing certain artificial dyes, such as sulphindigotic acid and picric acid, which were once popular, or modern aniline dyes, into contact with wool and silk. The pigments are in some way absorbed by the fibre, and the solution is robbed of its colour. It has been found by experience that temp. has a great deal to do with the goodness of the dye. The next process is similar to the first, except that the reduction of an insoluble colouring matter to a soluble state is an indispensable prelude. Thus, arnatto and indigo are applicable in this way if, that is, they have first been acted upon by solvents, whilst the pink pigment of safflower is set free by the action of "alkali."

Cotton possesses no affinity for native colouring matters. It is therefore necessary to introduce what are known as 'mordants' to prepare the material for the reception of the dye. An example will best illustrate the function of a mordant. It is required, let us say, to obtain black calico with the aid of the natural dye, logwood. First of all the calico is steeped in a hot aqueous solution of sulphate of iron. As the acid of this salt is not volatile, the cloth is passed through lime water, the effect of which is to precipitate the mordant, in this case, hydroxide of iron, which enters into some kind of intimate combination with the calico. If the calico is now put into a hot logwood decoction, it will, within half an hour or so, assume a dense black colour. (A great many substances are now employed as mordants, the chief of which are the salts of tin, iron, aluminium, copper, and chromium. Stannous chloride, or muriate of tin, is one of the most popular.) What has really happened is that the colouring principle (logwood) has lost its solubility and entered into combination with the iron hydroxide, the resulting compound being precipitated and in some manner infused into the fibre. The precipitate so formed is technically called a lake of the logwood, or the iron hydroxide. If the 'lake' were first made and then the calico put into a bath of it, there would be no D. at all, as the precipitate would simply rest on the surface of the fibre and would enter into no sort of intimate union at all.

There are two classes of mordants, the acid and the basic. *Acid mordants* include bodies such as tannin and oil mordants, e.g. that made by the action of strong sulphuric acid on olive oil. They are used largely for the fixation of basic dyes on cotton, the process being carried out either in a moderately cold solution

or up to about 70° C. A feebly acid substance is usually added to slow down the dyeing process and obtain even shades.

Basic mordants include the hydroxides of metals such as iron, chromium, tin, and aluminium, all of which are insoluble in water. They are used in conjunction with acid dyes. Wool is capable of splitting up some salts of these metals and precipitating the corresponding hydroxides. Cotton, however, is unable to do this, and therefore a salt of the required metal with a very weak acid such as acetic acid is decomposed by the action of water (hydrolysis) to give the metal hydroxide. Or sometimes a fixing agent is used to perform the precipitation of a basic substance.

Before proceeding to a classification of dyestuffs, there are a few other points to which it is necessary to draw attention. 'Adjective' dyes are those where a mordant is used, whilst the other and more direct dyes are often spoken of as 'substantive.' Mordants may be introduced in three ways: (1) By the 'mordanting and D.' method, the material is first mordanted and the D. is a separate and subsequent operation; (2) the material may first be dyed and afterwards mordanted, the two operations being performed in a reverse order. This is called the 'D. and saddening' method, and is largely employed with acid mordant dyes. As the colour is clearly fixed in the first bath and only developed in the second, this process does not commend itself for the matching of patterns; and (3) the two operations of D. and mordanting may be performed together by which it is called the 'single bath' method.

Classification of dyestuffs.—For convenience of discussion and clearness of arrangement, it is usual to divide dyestuffs into three broad groups: (a) Organic natural dyestuffs; (b) mineral dyestuffs; and (c) organic synthetic dyestuffs, which include nitro-, azo-, and azino-compounds; sulphurised dyestuffs, and quinone and triphenylmethane derivatives; the phthalocyanines (e.g. Monastral Blue); and such recent developments as Alcan Blue.

(a) *Organic natural dyestuffs.*—One of the oldest of these is indigo. This is obtained from the *Indigo tinctoria*, a plant much cultivated in India. For twelve hours the leaves are steeped in a water vat, and are then transferred to a second vat and agitated. The result of this is that the soluble indigo-white, formed in the first vat, is oxidised by means of the oxygen in the air to indigo, which falls down as a blue sediment. The contents of the vat are then boiled and repeatedly strained, after which the indigo is compressed into slabs, from which are obtained the well-known cubes of commerce. Natural indigo, like so many other native dyes, is now being rejected for an equally effective synthetic preparation. Yarn and piece goods especially are dyed with indigo. Textile fibres readily absorb the soluble indigo-white referred to above, which is obtained from the commercial product by the action of a reducing agent. Exposure to air re-oxidises the dye so

that the cotton or other stuff is dyed to the requisite blue. Indigo is freely used in combination to produce other shades. Logwood is derived from a tree indigenous to Central America, the scientific name for which is *Hæmatoxylon campechianum*. It is invaluable in the production of black or blackish wool and cotton, the shade depending on the particular mordant. Thus, with salts of iron it produces dark greys and black; with dichromates, various blues and black; with aluminium salts, purple; and with different copper salts, dull blends of green and blue. If a very fast black is wanted for cotton, it is usual to employ iron-tannate as the mordant. This is fixed on to the fibre by first working the cotton in a decoction of sumac or some other tannin compound and then dipping it into a bath of the soluble iron salt. The cloth is now ready for immersion in logwood, provided, that is, it has been first thoroughly well washed. Cochineal, which is obtained from a small insect, the *Coccus cacti*, is especially suitable for animal fibres, and can be made to impart some fine scarlets and crimsons to woollen fabrics. Various reds and reddish-browns are still produced in wool-D. from sanderswood, barwood, and camwood, which are procured from W. African species of *Baphia* and *Pterocarpus*. Different shades of yellow are procurable from fustic, which comes from the *Morus tinctoria*, a species of mulberry tree, and also from weld, which comes from a wild mignonette (*Reseda luteola*); Persian berries, derived from the Rhamni of the Levant, and from the Quercitron bark, which is the inner bark of a N. American oak (*Quercus tinctoria*).

(b) *Mineral dyestuffs*.—These have been largely replaced by coal-tar dyestuffs. The colours obtainable are Prussian blue, manganese brown, chrome yellow, and iron buff. The first is procured on cotton by treating it first with prussiate of potash and then with salts of iron, whilst on wool the prussiates must be decomposed with mineral acids. The brown is produced from potassium permanganate. Animal fibres boiled in a solution of this salt become impregnated with it, and the permanganate thus absorbed is easily reduced to the insoluble manganic hydroxide, which is also brown. If cotton is to be dyed brown, it must be mordanted with manganous chloride. After the D. operation, it must be passed through a hot solution of sodium hydrate so as to get a precipitation of manganous hydroxide. This salt is readily oxidised to the brown manganic hydroxide, the common practice being to pass the cotton into a cold and dilute solution of bleaching powder. Ferric hydroxide gives iron buff, and yellow and orange may be obtained in cotton D. by fixing lead sulphate or lead oxide on to the fibre, and then submitting the fibre to a solution of bichromate of potash.

(c) *Organic synthetic dyestuffs*.—A remarkably wide range of colours is producible from such dyestuffs, and as they are easy to manipulate and effect often a cheaper and faster dye than the natural

dyestuffs, they are popular with manufs. and are rapidly superseding the former class altogether. Generally speaking, the colour depends on the chemical group to which the dye belongs. It will be convenient to classify these colouring matters:

(1) *Nitro-dyestuffs*.—These are applicable to animal fibres, which are dyed in a bath slightly acidified with sulphuric acid. The chief members of this section are aurentia, picric acid, Victoria-palantine and naphthaline-orange, and naphthol, yellow.

(2) *The di- and tri-phenylmethane group*.—Methyl violet, magenta, malachite green, and auramine, and indeed most of the basic dyes, belong to this class. If sulphonated, these bodies become acid dyes and give such colours as acid violet, acid magenta, guinea-green, etc. Wool is dyed most of these colours in a neutral bath. The dye-bath is at first cold, but the temp. is gradually raised to boiling point so that practically the whole of the bath is exhausted. Cotton fabrics should first be mordanted with tannic acid and fixed in tartar emetic. The chief objection to this class is that they are fugitive to light.

(3) *The azo-group*.—Members of this class may be sub-divided into monazo-disazo-, trisazo-, etc., dyes according to the number of their azo-groups, and they may be still further split up into oxyazo-(OH), and amino-azo-(NH₂) dyes. In this group are counted nearly all the direct dyes, and their application is quite straightforward. Acid or neutral bathis may be used. One means of overcoming the tendency of these colours to fade on exposure to light is to treat the fabric after D. with a hot solution of chromium fluoride, or copper sulphate. Under this heading fall the benzidine colours. Azo dyes form about half the total number of dyes in general use.

(4) *Anthracene-derived dyes*.—Alizarin (synthesised in 1868 by Graebe and Liebermann) is the oldest of these. Others are, anthrapurpurin, flavopurpurin, anthracene blue, alizarin brown, alizarin green, alizarin indigo blue, alizarin black. In recent times sev. vat dyes have been made. These vat dyes, like indigo, are insoluble in water, but can be obtained as the leuco-compounds when reduced. These are soluble in alkalis, and if the fabric to be dyed is steeped in an alkaline solution of the leuco-compound, the latter is taken up. Subsequent oxidation brings out the coloured material required.

Indanthrene (in various shades of green, yellow, etc.), the Alcol colours, (yellow, red, etc.) and anthraflavone are examples. The trade name for the common method of obtaining some alizarin colours is the sulphated oil process. The stuff to be dyed is impregnated with alizarin oil, and then dried. After being mordanted with aluminium acetate, it is dyed, steamed and finished. Alizarin gives splendid Turkey-reds on cotton. These dyestuffs give stable colours.

(5) *Aniline black*.—The composition of this colour is still a vexed question. It is

produced by the oxidation of aniline. There are, broadly speaking, three stages in the oxidation. Emeraldine is produced if the oxidation is limited; nigraniline is the second product and gives a violet-black; the third and final product is ungreenable black, which is remarkably stable.

(6) *The phthalein group of colouring matters.*—This includes gallein, erythrosin, and the eosins. The dyes produced are wonderfully bright but fugitive to light.

(7) *The synthetic indigo group.*—The synthetic production of indigo on a manuf. scale was made possible by the researches of Baeyer (1880) and Heumann (1890). Indigo itself is a vat dye. Other dyes are the alibia colours (containing bromine) thioindigo colours (containing sulphur), etc.

(8) *The sulphide dyes.*—These have been largely developed of late years. They are insoluble in water, but are soluble in sodium sulphide. Frequently the dye is reduced to a leuco-compound, which is then taken up by the fabric, when subsequent oxidation brings out the colour. They are largely used for D. artificial silk, but are not so good for wool. They give excellent fast colours. Vidal black is a typical example.

(9) *The phthalocyanines.*—The first phthalocyanine dye was discovered by chance in 1928, during the routine manuf. of phthalimide at Grangemouth. It and other members of its class may be regarded as being built up of four molecules of phthalonitrile and a nucleus consisting of either two atoms of hydrogen or an atom of almost any metal, e.g. copper. Phthalocyanines were first marketed in 1935.

(10) Other classes of dyes are azine, oxazine, thiazine, thiazole, acridine, nitro, quinoline.

Theory of Dyeing.—It is probable that the process, as applied to wool and silk, results in chemical action, but it is idle to make even this tentative assertion in the case of cotton and other vegetable stuffs. Writers on the subject uphold either the mechanical or chemical hypothesis. According to the first the colouring matter is absorbed into the fibres of the material; variation in size of dye molecules and in the pores of different fibres accounts for the fact that the same dye will not colour all fabrics equally well; furthermore, heat and the action of certain chemicals are held to expand the pores. The following facts support the chemical combination theory: not only colouring matters, but also textile fibres are all either acid, or acid and basic in character, and the fibres can absorb and retain acids, alkalies and certain salts. See A. Flindley, *Treasures of Coal Tar*, 1917; A. R. Ramsey and H. C. Weston, *Artificial Dyestuffs*, 1917; A. G. Green, *The Analysis of Dyestuffs*, 1920; K. Saunders, *The Aromatic Diazo-Compounds*, 1937; C. Whitaker and C. Wilcock, *Dyeing with Coal Tar Dyestuffs*, 1939.

Dye Trade. The hist. of the trade in dyestuffs goes back to the middle of last century, when Sir W. H. Perkin (then a

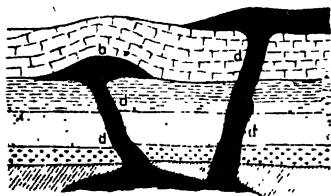
lad of 18), discovered the aniline dye, 'mauve' or 'mauveine.' Eng. people were slow to see the importance of the discovery, and as a result of farsighted action on the part of the Gers. there was developed in Germany an immense dye-making industry, enabling the Ger. firms to obtain practically a monopoly of the dye trade of the world. When the First World War broke out the Gers. had ready to hand factories fully equipped for the production of high explosives of all kinds in great quantities. On the other hand Great Britain and her allies were put in a position of the gravest possible embarrassment and danger owing to the absence of such factories. After the armistice of 1918 the Brit. Gov., as the result of a series of resolutions passed by the Allies in Paris, took steps to prohibit the import of dyestuffs under the Customs Act, 1876. It was decided in the Courts that the prohibition was illegal, and accordingly the Import Regulation Act of 1920 was passed, setting up a Committee for the issue of licences for the importation of dyestuffs. Unfortunately there was an interval of nearly a year between the decision of the Courts and the operation of the Act, and the Gers. availed themselves of that opportunity to pour into Great Britain enormous quantities of dyes of all kinds. The result was that for over two years after the Act became effective the dye-makers of this country were struggling against an overwhelming burden of foreign competition. Since then, however, they have made very remarkable strides indeed—so remarkable that an unsuccessful effort was made by the Labour Gov. in 1930 to put an end to the Act of 1920 (generally known as the Dyestuffs Act), the assumption being that the Brit. dye-makers had done so extraordinarily well that they were in no further need of protection. To-day, of the dyestuffs used in Great Britain 93 per cent are produced in the country and all the intermediates are home-made. All that is left to the foreign producer is 7 per cent, consisting very largely of comparatively small quantities of dyes of a novel or particularly complex type, because Brit. dye-makers have wisely concentrated on the production of dyes for which there is the greatest demand. Before the First World War the production of dyes in Great Britain was about 9,000,000 lb. avoidupois; by 1931 it had become 55,000,000 lb., and exports, which were 4,000,000 lb. before the First World War, were 15,000,000 lb. When the Act came into operation at the end of 1920 the price of dyestuffs was 4s. 4d. per lb.; the pre-war price was 1s. per lb. To-day the average price of Brit. dyes is 1s. 5d. per lb. The Brit. dye-makers claimed that this Act must be continued for a time unless the country is prepared to run the risk of seeing a great deal of the work which had been done thrown away and the development of the industry suddenly arrested, and this view prevailed in the House of Lords where the gov. was defeated. Both in Germany and the U.S.A. the substantial dye-making industries have been sheltered by high

protective tariffs, securing for the dye-makers a monopoly of their own market. This has been very effective in the U.S.A. where the tariff Act of 1930 levies a duty of 7 cents per pound plus 10 per cent *ad valorem* on Amer. selling price of similar competitive articles. The result is that in the last year reported the U.S.A. produced 111,121,505 lb. of dyes, 13,244,676 lb. of colour lakes, 5,000,000 lb. of coal tar medical products, 1,599,430 lb. of coal tar perfumes and 2,292,450 lb. of perfumes. Before the First World War, the production of dyes in Great Britain was about 9,000,000 lbs.; by 1935 it was well over 50,000,000 lbs.; while exports had risen from 4,000,000 lbs. to 16,000,000 lbs. See H. Levinstein, *The British Dyestuff Industry*, 1919.

Dyk, Victor (1877-1931), one of the leading men of letters and dramatist, as well as politician, of Czechoslovakia, *b.* at Psovek, Bohemia. As a lyrical poet, he found his themes in exhortation to his nation and political satire. His dramas were noted for an epigrammatic style, but as a novelist he was less successful. When Czechoslovakia became a free nation, he was a member of the Legislative Assembly, then of the House of Representatives and, finally, of the Senate. Among his vols. of verse are *Force of Life* (1898), *Fanities* (1900), *Satires and Sarcasms* (1905), *The Window* (1921), and *The Ninth Wave* (1930). See lives by H. Jelínek, 1932, and A. Novák, 1936.

Dyke Acland, Sir Henry Wentworth, see ACLAND.

Dykes are wall-like masses of igneous rock which fill up more or less vertical fissures in the earth's crust, and are so called from the Scottish word for wall.



DYKE

- d. Igneous rock forcing its way in overlying stratified rocks. When this solidifies, in the cracks igneous dykes are formed.
- b. A dome of lava solidified before coming to surface—a laccolith.

The two main characteristics of D. are: (1) They are bounded by more or less parallel surfaces and are of nearly constant width; (2) they are generally vertical at the time of intrusion. They commonly occur on the sites of old volcanoes, and the manner of their formation can be observed in the active volcanoes such as Vesuvius and Etna. Volcanic cones are fissured either by the hydrostatic pressure of the column of lava in the pipe, or by

explosions due to the pressure of dissolved vapours and gases acting on the walls and roof of the funnel. Into the rents and fissures so formed the lava rises, forming D., veins, and horizontal sheets or sills. If the lava is extremely fluid, it ascends rapidly in the cracks and fissures and, cooling quickly on the outside but more slowly in the centre, forms D. with a vitreous edge and a crystalline interior. When, however, the lava is most viscous, it may solidify before reaching the top of the fissure, leaving a cavity which in time becomes filled with fragmental material by the crumbling of the walls, thus giving rise to 'Agglomerate D.' Since D. are of deep-seated origin, they are only exposed to observation as the result of erosion. If the sedimentary strata, into which they have been injected, are more easily weathered than the igneous material of the D., the latter stand up as vast walls, while where the igneous rock is more easily denuded the course of the D. is represented by a trench. As a general rule, D. run in straight lines, but may occasionally be zigzag. They vary in thickness from a few inches to 20 or 30 yds., and may be any length from a few feet up to 100 m. The Cleveland D. of the N. of England is 60 m. in length, and some of the Scottish D. are even longer. As well as forming a network in fissure eruption regions, as in Scotland, Iceland, and the Faroe Is., D. occur in the neighbourhood of large plutonic intrusions, such as granite bosses. These D. are finer grained than the granite from which they come, and may merge into mica porphyries, granophyres, and quartz-felsites. Where D. are intruded in the sedimentary strata, whether through fissures or along joint planes, the adjacent rocks are to some extent affected by the extremely high temp. of the igneous material. The rocks may occasionally be recrystallised, sandstones being altered to semi-crystalline quartzites, and limestones converted into crystalline marbles; more often, however, they are only baked or indurated, as when soft clays are metamorphosed to flinty shales, Lydian-stone, or porcellanite (see METAMORPHISM). Regarded petrographically, D. belong to the phase 'Minor Intrusions' (sometimes called the dyke-phase), the third phase in the regular cycle of igneous activity, and according to their distribution and arrangement may be referred to two types: (1) D. in plateau regions; (2) D. in mt. dists. The former are characterised by a regional parallelism, whilst the latter are more often grouped about certain centres and tend to a radiate arrangement. See IGNEOUS ROCKS, VOLCANOES, etc.

Dykes, John Bacchus (1823-76), Eng. church composer; graduated at Cambridge, and became junior canon and precentor of Durham in 1849. Doctor of Music in 1861, and vicar of St. Oswalds, Durham, 1862. As joint-editor of *Hymns Ancient and Modern*, he wrote for that compilation some of its best-known tunes, e.g. 'Jesus, lover of my soul'; sev. of his anthems and services also have attained great popularity.

Dykh-Tau, third highest mt. in the Caucasus, 17,190 ft.; it belongs to the Elburz group.

Dymoke, Eng. family holding the right of hereditary championship to the crown. Their representative formerly had to appear at the coronation banquet and challenge all comers to dispute the king's title. This office is held by tenure of 'grand serjeanty' in connection with the manor of Scrivelsby, Lincolnshire, which passed to Sir John D. (fourteenth century) by his marriage with the heiress of the Marmions.

Dynamical Units, see UNITS.

Dynamic Isomerism, see TAUTOMERISM.

Dynamics (Gk. *dynamis*, strength, force), the science of motion, a branch of mechanics devoted to all problems of motion, as opposed to *Statics* that deals with problems of bodies in equilibrium or at rest. D. depends on three laws, called Newton's laws of motion. These state (1) Every body continues in a state of rest, or of uniform motion in a straight line, except in so far as it may be compelled by impressed force to change that state; (2) change of motion (momentum) is directly proportional to the impressed force, and takes place in the direction in which force acts; (3) to every action there is always an equal and opposite reaction, viz. if a body A exerts a force on a body B, then simultaneously the body B exerts an equal and opposite force on the body A. On these three laws depend all our knowledge of motion of terrestrial and heavenly bodies. Einstein's theory of relativity has shown that in certain very special problems the system of mechanics based on Newton's laws fails to account for the quantitative results obtained. The science of D. was begun by Galileo at the end of the sixteenth century, when he studied the motion of falling bodies and disproved the Aristotelian idea that the speed of a falling body depended on its weight. Galileo, Huyghens, and especially Newton, laid the foundations of the subject, which was further developed by continental mathematicians in the eighteenth century, and subsequently by numerous other mathematicians and scientists. See S. Loney, *Treatise on Elementary Dynamics*, 1889-92; H. Lamb, *Dynamics*, 1923; E. T. Whittaker, *A Treatise on the Analytical Dynamics of Particles and Rigid Bodies*, 1927; S. Goldstein (ed.), *Modern Developments in Fluid Dynamics*, 1938; M. Davidson, *Introduction to Dynamics*, 1918.

Dynamite, explosive consisting of some absorbent material impregnated with nitro-glycerin. Nitro-glycerin, which was discovered by Sobrero in 1846, is produced by dropping glycerin into a mixture of strong nitric acid and strong sulphuric acid, and is itself a powerful though dangerous and unreliable explosive. In 1863 Alfred Nobel commenced experiments with absorbent substances with a view to arriving at a solid or plastic explosive with nitro-glycerin as its active constituent. He was only moderately successful until he applied the method of causing explosion by detonation with

mercury fulminate. He finally fixed on a siliceous earth known as kieselguhr as the absorbent best suited for the purpose. Kieselguhr or guhr is composed of the fossilised remains of diatoms, and consists of silica to the extent of about 95 per cent. It is found in Austria, Germany, Norway, Scotland and Australia. It has the advantages of being itself inert and non-combustible, and of being capable of absorbing three times its weight of nitro-glycerin. In actual manuf. the nitro-glycerin is produced by mixing three parts of nitric acid of sp. gr. 1.5 with five parts of sulphuric acid of sp. gr. 1.84; the mixture is cooled and the nitro-glycerin is introduced in a thin stream by means of compressed air. The kieselguhr is prepared by calcination at low red heat in which moisture and organic substances are removed. The guhr is usually pink at this stage, owing to the presence of iron. (If not, red ochre is added.) Magnesium carbonate or calcium carbonate up to 2 per cent is then ground in. (These carbonates serve to neutralise any acid subsequently formed if the nitro-glycerin decomposes during the lapse of time before the dynamite is used.) The well-ground mixture is then sifted through a 30-mesh sieve. The guhr is weighed out into lined rubber bags, and three parts of nitro-glycerin are added for every part of guhr, and the mixture is thoroughly completed by hand, after which the product is compressed into cartridge form by means of a special D. pump in which all precautions are taken to avoid friction. The D. is then wrapped in waterproof paper. D. is a greasy plastic solid of sp. gr. 1.55 to 1.65. It burns quietly when ignited, but may be exploded by a fairly vigorous percussion. It explodes with great rapidity, requires very little tamping, and has great shattering power if simply laid upon the ground. This has given rise to the saying that 'dynamite explodes downwards', as a hole is torn in the ground even when it is unconfined in other directions. It loses only one-sixth of its power under water, so is well adapted for subaqueous operations. It freezes at 40° F., and when frozen is difficult to explode. The operation of thawing D. is attended with some danger, and should only be performed when the rise of temperature can be carefully regulated. D. is used chiefly for blasting. Its shattering power is too great for quarry work generally, but for breaking up huge boulders and roots of trees, and for destroying obstacles to navigation under water, its efficacy is unrivalled. The rapidity of explosion renders its use as a propellant in guns impossible, though used as a shell explosive in the pneumatic guns of the U.S.A. military and naval services. There are many modifications of the D. made with kieselguhr. One of these is blasting gelatine, where the nitro-glycerin is incorporated with collodion cotton, forming a gelatinous plastic material which is quite unaffected by damp. In order to prevent D. from freezing, the addition of such compounds as monochlorodinitro-glycerin or glycerin

dinitrate has been suggested. See A. Marshall, *Explosives*. 1917-32; J. Reilly, *Explosives. Matches and Fireworks*, 1938.

Dynamo, see ELECTRIC GENERATOR.

Dynamometer, any instrument used for the measurement of force or power developed in machinery. It is often termed a brake or absorption D., so called because it absorbs energy from the machine due to a frictional resistance. The instrument measures this absorption, and so affords a method of obtaining the rate at which the machine is doing work on the brake. As a transmission D., it transmits the power measured without any absorption of energy other than that due to the friction of the machine, and which by construction can be reduced to a minimum.

Dyne, dynamical absolute unit of force in the centimetre-gramme-second (C.G.S.) system. It is defined as the force which, applied to a mass of one gramme, will produce in it an acceleration of one centimetre per sec. The practical unit of force is the megadyne, i.e. 1,000,000 dynes.

Dyrrhachium, see DURAZZO.

Dysart, royal burgh and seaport, near Kirkcaldy, Fifeshire, Scotland; the earldom of D. dates from 1643. There are coal mines near and the tn. weaves textiles and exports coal. Pop. 4500.

Dysentery (Gk. *δυσ*, difficult; *έντερον*, intestine), an infectious inflammatory disease of the large intestine, characterised by the formation of ulcers and the consequent evacuation of blood and shreds of tissue. The disease was at one time common in temperate climates, but is now practically restricted to the tropics, particularly where sanitary arrangements are imperfect. It was a serious disease in the First and Second World Wars. There are two main types: *amoebic D.*, caused by the presence of a protozoan, *Amoeba dysenteriae*, and *bacillary D.* Two distinct bacilli have been identified as associated with dysenteric symptoms; that discovered by Shiga in Japan and that discovered by Flexner in the Philippine Is.

Symptoms.—The onset of the disease is accompanied by general illness and diarrhoea. The desire to evacuate is particularly distressing and the discharge is often scanty in amount. The evacuations are at first slimy, then blood-streaked, and if the disease is not checked, ultimately consists almost wholly of blood and shreds from the lining of the large intestine. The ulceration commences about the solitary glands of the colon (large intestine), and gradually spreads until the greater part of the organ is affected. Occasionally the ulcers perforate the intestine, and death is likely to result from hæmorrhage or peritonitis. Febrile symptoms become intensified, it is difficult to satisfy thirst, and the patient becomes greatly exhausted. Gangrenous matter may appear in the evacuation. If recovery takes place, convalescence is protracted, and the disease may persist in a chronic form for years, as the injury to

the tissues of the colon is usually extensive. A troublesome complication of amoebic D. is the formation of abscesses in the liver, often some time after the initial attack.

Treatment.—Owing to the great mortality produced by the disease when epidemic or endemic, preventive measures are of great importance. The stools of infected and convalescent persons should be disinfected and not allowed to contaminate drinking water; precautions against house flies are also necessary, since they frequently spread the disease. The diet should be carefully regulated, no intemperance either in eating or drinking should be permitted, and unripe fruit should be avoided. The most efficacious remedy at the onset of the disease is a good dose of castor oil accompanied by laudanum. Afterwards, ipecacuanha or large doses of salines should be administered. The pain may be alleviated by opium administered every two or three hrs. Opium in warm water and antiseptic solutions may be injected into the bowel, but frequently the passage is so inflamed and irritated that such treatment becomes impossible. Enomata of quinine have been found particularly efficacious in amoebic D. The variety caused by the bacillus of Shiga is best combated by the specific anti-toxin. In some cases of D. recourse is had to appendicostomy, when the appendix is brought to the surface and used as an entrance for irrigating fluids. The active principle of ipecacuanha, emetine, has now been extracted and can be injected or given through the mouth in cases of amoebic D.

Dysmenorrhœa, see under MENSTRUATION.

Dysodil, yellow, greyish, or greenish mineral substance found in Sicily. It is bituminous, and burns vividly, with a disagreeable smell. It is laminated in structure, and often contains fossil fishes and plants.

Dyson, Sir Frank Watson (1868-1939), astronomer royal, Greenwich Observatory from 1910 to 1933; b. at Ashby-de-la-Zouch; son of Rev. Watson D., Baptist minister. He was educated at Bradford Grammar School; and at Trinity College, Cambridge—where he had a distinguished career, being Second Wrangler and Smith's prizeman, also winning the Isaac Newton studentship. He was chief assistant at the Royal Observatory, Greenwich, 1894-1905, and secretary to the Royal Astronomical Society, 1899-1905; in the latter year he was appointed Astronomer Royal for Scotland. He became F.R.S. in 1901, and contributed many mathematical and astronomical papers to the society's *Transactions*, and other scientific journals, and besides official publs. wrote *Astronomy: a Handy Manual* (1910) and (with R. Woolley), *Eclipses of the Sun and Moon* (1937). Knighted 1915.

Dyspepsia (Gk. *δυσ*, badly; *πέψιν*, to digest), functional derangement of the digestive processes. It is simply another name for indigestion, which may be due to general weakness in the organism owing

to other disease, or may be caused by the imperfect carrying out of digestion owing to unsuitable habits of life. By far the commonest cause of D. is improper feeding, either as regards quantity and quality, or as to the manner in which the food is assimilated. The general tendency is to eat too much and too hurriedly. In the first case the stomach and intestines are overworked, and in the second they are given unsuitable material to work upon owing to insufficient mastication. Other causes are the taking of large quantities of liquid during meals, thus diluting the secretions of the digestive tract, and the excessive use of stimulants, including alcohol, tea, coffee, aromatic substances, and smoking. D. may be traced to causes not directly connected with food. Diseases of the teeth, liver, and pancreas, catarrh of the stomach, poverty of the secretions owing to deficient blood supply are all possible precursors of difficult digestion. One of the characteristic symptoms of incipient consumption is a particularly intractable indigestion. Any derangement of the nervous system, such as is caused by worry, mental anxiety, or excitement, is liable to interfere with proper digestion.

The *symptoms* of D. include flatulence, eructations, heartburn, and the characteristic furred, pallid, or pimple tongue. Discomfort is felt in some part of the digestive tract; diarrhoea is likely if the condition be temporary, whilst constipation is characteristic of a more chronic form of D. Other organs suffer impairment of function; vision becomes cloudy or weak, the muscles lose their power to some extent, and there is a general feeling of unfitness for effort. Perhaps the greatest suffering is due to mental symptoms; the dyspeptic finds it difficult to take an optimistic view of things, and is a prey to irritable impulses and gloomy foreboding.

Treatment.—In the first place, D. may be avoided by giving some attention to diet. Faulty teeth should be repaired or replaced, a habit of thorough mastication must be formed, food must be taken regularly and in reasonable quantity, and fluid should be taken separately from the more solid constituents of food, and should preferably be plain water. There are many systems of diet advocated as preventive of D. Probably all of them prove beneficial in some cases or other, but the individual can generally hit upon a system which suits his own peculiar tastes and habits of life. The great secret is temperance. An estab. dyspeptic need not necessarily have recourse to drugs. He should take regular exercise, devote plenty of time to meals, avoid all food which his experience shows him to be unsuitable, and fight against a habit of constipation. When drugs are recommended, the particular circumstances must be borne in mind. A transitory attack may be met with a purgative. If stimulants are required, whisky, quassia, and gentian tonics are usually recommended. Bismuth carbonate has a soothing effect on the nerves of the gastric region. If acid

is deficient in the gastric juice, dilute hydrochloric acid may be taken, and other constituents of the secretions replenished with pepsin or rennet. Where the presence of gaseous products causes discomfort, charcoal in the form of biscuits has an easing effect.

Dysprosium, metal belonging to the 'rare earth' family. It was discovered in 1886 by Lecoq de Boisbaudran. Its symbol is Dy, its atomic number 66, and its atomic weight 161.2 (H = 1) or 162.5 (O = 16). D. oxide is a white solid. D. occurs naturally in the minerals euxenite, fergusonite, xenotime, polycrase and gadolinite, etc. Chemically it is related to erbium, holmium and thulium.

Dytiscidae, or true water-beetles, are coleopterous insects with bare eleven-segmented antennae, and hind legs capable of swimming only. The perfect insect is purely aquatic, though it can fly from one pond to another, the larva is also aquatic, but before changing into a pupa it comes to earth and buries itself, and the pupa is wholly terrestrial. The beetle can live for sev. mins. in a submerged state, but it is obliged to come to the surface for air: this it stores up in air-tubes under its elytra, or wingcases, which fit tightly to its body. It is an active creature, carnivorous of habit: it grasps the prey with its legs and then feeds by its toothed jaws, or mandibles. The larva has hollow, curved mandibles which are used for piercing the prey and sucking the juices from it swiftly and fiercely. The males are frequently found in the mating position attached to the females by suckers on their fore-feet. There are nearly 2000 species of this family already known inhabiting water of cooler parts of the world, and among the chief genera are *Dytiscus*, *Cybister*, *Acilius*, and *Hydroporus*. Related families are the *Gyrinidae* (whirligig beetles) and the *Hydrophilidae*.

Dzaisang, see ZALIAN.

Dzaojikao (formerly Vladikavkaz), cap. of the North-Ossetian Autonomous Republic of the R.S.F.S.R. It is a large tn. with wide acacia-lined avenues, and tram-cars, a huge mkt., and a magnificent view of the Caucasus range, dominated by the rugged peak of Mt. Kazbek some 30 m. to the S. Through the tn. flows the swift Terek riv. A degree of oriental colour and even squalor is provided by the existence of many 'dukhangs'—underground eating and drinking places, and though these nominally belong to the tn. council's organization of catering establs., they are not run on ideal lines. Pop. 80,000.

Dzhalal-Abad, Region of the Kirghiz S.S.R., Soviet Central Asia, in the Tien-Shan mts.

Dzherzhinsky, Felix Edmondovich (1877-1926), Russian revolutionary of Polish birth: b. at Vilna. He joined Social Democratic Party in 1895. Between 1897 and 1902 he was sent to Siberia three times, and three times escaped. Took part in revolution of 1905, and was banished: returning to Warsaw in 1912, was imprisoned until released by the revolution of March 1917. He organ-

ised the secret police or Cheka—later known as the OGPU. In 1921 he became commissar of transport. In 1924 he was head of the supreme Economic Council.

Dzhugashvili, Josif Vissarionovich, see STALIN.

Dzungaria or Zungaria, mountainous region of Sinkiang, China, bordering on Russian Turkestan, and lying between the Tien-Shan on the S., the Greater Altai on the N., and the Mongolian Gobi on the E. The surface is mainly a desert and slightly

hollowed plateau, but there are large tracts of forest, and the plains and valleys afford good pasturage, while cereals are grown in parts. There are numerous int. streams, but the only important rivs. are the Black Irtysh and the Ili. The minerals include gold, copper, iron, and salt. The country was conquered by the Chinese emperor in the eighteenth century. The inhabs. include the Kalmuck Dzungars and Turgots, and also Khalkas and Dungsans, Chinese and Kirghiz.

E

E, fifth letter of the Eng. alphabet, was originally (i.e. in the Semitic alphabet) a consonant, having the phonetic value of *h*, and was called *he*. When the Gks. took over the Semitic alphabet, *he* became *epsilon*; in some varieties of the Gk. alphabet it was adopted to represent the short *e*, while the Semitic *heh* was adopted to denote the long *e* or *ē*. (In other Gk. alphabets, *epsilon* was adopted both for the long and the short *e*.) The Etruscan and the Lat. alphabets used the letter **E** for the sound *e* as in 'men' or 'prey' and made no distinction between long and short vowel.

E is the most frequently used of all the Eng. letters. Its phonetic value, however, varies: the long *e* (as in 'me') agrees with the continental *i*; the short *e* (as in 'men') and the open and long *e* (as in 'prey') agree with the continental *e*; whereas as a final letter it is usually silent (as in 'table').

As a numeral, **E** stands for 250, and in the calendar it is the fifth of the dominical letters.

E, in music, is the third note in the natural scale of C. Its major key has four sharps.

Ea, one of the twelve great gods of the Assyro-Babylonians, god of the ocean and subterranean springs, called Oannes by Berossus (third century B.C.). **E** was father of Merodach. Eridu (modern Abu Sharhrein) was especially sacred to him, as also the Euphrates.

Eadie, John (1810-76), Scottish theologian. From 1843 to the end of his life he was prof. and lecturer of biblical literature in the United Secession Divinity Hall. He possessed wide learning and much power of exposition. His chief works are: *Biblical Cyclopædia* (1819), *Ecclesiastical Encyclopædia* (1861), ed. of Cruden's *Concordance* (1839) and the *Family Bible* (1851).

Eadmer (or **Edmer**) of Canterbury (c. 1064-1124), Eng. historian and monk, intimate friend and chaplain of Anselm. He was nominated bishop of St. Andrews in 1120, but as there was controversy between Canterbury and York for jurisdiction over the see, while the Scottish king maintained his independence of either, **E** returned and resigned the position. His chief works: *Historia Novorum*, 1060-1122 (first printed 1623), and *Vita Anselmi* (publ. 1551) are both in the Benedictine ed. of Anselm's *Works*, 1721. **M. Rule's** ed. in the Rolls series appeared in 1884. **E's** lives of Dunstan, Bregwin, and Oswald are in H. Wharton's *Anglia Sacra*, II. (1691). See G. Grub, *Ecclesiastical History of Scotland*, 1861; Père Raguey, *Eadmer*, 1892.

Edgar the Peaceable, see **EDGAR**.

Eads, James Buchanan (1820-87), Amer. engineer and inventor, granted a

gov. contract (1861) for constructing a fleet of ironclads for use on the Mississippi. With these, the capture of Fort Henry was effected during the Civil War. **E** constructed the steel arch bridge at St. Louis (1867-71), and undertook to deepen the Mississippi's channel by means of jetties. He also planned a ship-railway across Tehuantepec isthmus, but his project was not carried out. See How, *J. B. Eads*, 1900.

Eagle: (1) A gold coin of U.S.A., worth 10 dollars or over £2 10s. The double **E** is a gold \$20 piece, and there are half and quarter **E's**. The bird represented is the *Haliaeetus leucocephalus* (bald or white-headed **E**). (2) The military standard of the Romans, and earlier nations. The Persians, in the time of Cyrus the Younger (fourth century B.C.), carried an **E** on a spear as their standard. The Rom. **E** was of silver, bronze, or gold, with wings extended. It was carried on the top of a spear, with a cross-bar supporting it. Some held thunderbolts in their talons. Napoleon's armies had a similar standard (1804). As an armorial bearing the Imperial **E** was adopted by the Holy Rom. empire, and later by Austria, France, Germany, Russia, U.S.A., and Poland.

Eagle, term employed in speaking of many species of Falconidae in the subfamily Aquilinae. They occur in all parts of the world, usually building eyries in forests or on mountains, and all are fierce and powerful birds of prey. The species described in mythology and art belonged to the genus *Aquila*, but it is not known from actual specimens. *A. chrysaetos*, the golden **E**, is a large and fiercely predaceous bird rarely found in Britain though it has been known to breed in remote parts of Scotland. Its nest or eyrie is usually built on cliffs or mts. *A. nevadensis*, the spotted or screaming **E**, occurs in N. Europe. The sea-**E's** are represented by the genera *Haliaeetus* and *Thalassaeetus*; the hawk-**E's** by *Spizaeetus* and *Limnæus*; the fishing **E's** by *Pandion*; the harrier-**E's** by *Circus*. The Erue or White-tailed sea-**E**, *Haliaeetus albicilla* ceased to breed in Britain only in comparatively recent years. The **E** has been adopted by various nations as a symbol of power, particularly by Germany or, again, as exemplified in the Bible (Ek. xvii.) or as an emblem of nobility and generosity; while, in Christian art, it typifies meditation, and is the symbol of St. John the evangelist. In the Bible, the Hebrew term (*neshet*) equivalent to Gk. (*æeros*), like the Arabic *nisr*, denotes sev. birds of prey. Probably the griffin culture is most often intended. It has no true feathers on head and neck, hence the phrase 'enlarge thy baldness as the **E**' (Mic. i, 16) This bird abounds in Palestine, making its nests in the high

cliffs overlooking the valleys (Jer. xlix., 16). The E. is noted for the telescopic range of its vision, and spies its prey from immense distances, while its flight seems to be watched by many other birds that follow to feast upon the carrion (Matt. xxiv., 28). There is an allusion in Ps. ciii. to the anct. belief that the E. was able to renew its youth. In the Middle Ages it was believed that every ten years the E. beat its way upward high into the sun, whence, plunging



GOLDEN EAGLE

into the sea, its old plumage was shed for new, and its youth was restored. See under separate headings for descriptions of species.

Eaglehawk, municipal bor. of Bendigo co., Victoria, Australia, 4 m. from Bendigo, and 105 m. from Melbourne; noted for fine gold mines. Pop. 5000.

Eagle-hawk, see HAWK-EAGLE.

Eagle Island, Ireland, see ACHILL.

Eagle-owl, or *Bubo*, genus of the family Strigidae, which is represented in all parts of the world but Australia.

Eagle Pass, tn. of S.W. Texas, U.S.A., on the Rio Grande, in an agric. and coal-producing dist. Pop. 6400.

Eagle-wood, see ALOES-WOOD.

Eagre, see BORE.

Eakins, Thomas (1844-1916), Amer. painter; b. at Philadelphia, Pennsylvania; studied art in Paris under J. L. Gérôme at the Ecole des Beaux Arts, also under Léon Bonnat. Also worked in the studio of Dumont, the sculptor. In America, he was prof. and lecturer on anatomy and painting in various schools of art. Assisted his pupil, Samuel Murray, to model the colossal figures of the Prophets on the Witherspoon Building at Philadelphia; modelled two reliefs on the Trenton battle monument, also the horses ridden by Grant and Lincoln on the Soldiers' and Sailors' Monument at Brooklyn. Painted the Crucifixion in Overbrook Seminary; portrait of Cardinal Martinelli; and many other portraits—being best known as a portrait painter.

Ealdhelm, or **Aldhelm** (c. 640-700), Saxon ecclesiastic and scholar, educated

at Canterbury. He became abbot of Malmesbury (676), and bishop of Sherborne (705). The Church of St. Lawrence at Bradford, Wiltshire, alone remains of his buildings. He wrote treatises and verse in Lat. and Eng., some of which survive. The best known are: *De laude virginitalis* (prose) and *De laude virginum* (poetry). See J. A. Giles (ed.) *Opera*, 1844; G. F. Browne, *Aldhelm*, 1903; J. H. Pitman, *The Riddles of Aldhelm*, 1925.

Ealing, pari. bor. and suburb of London, England, 9 m. W. of St. Paul's Cathedral. The anct. vil. now the centre of the tn., lies S. of the high road to Uxbridge. Pop. 120,000.

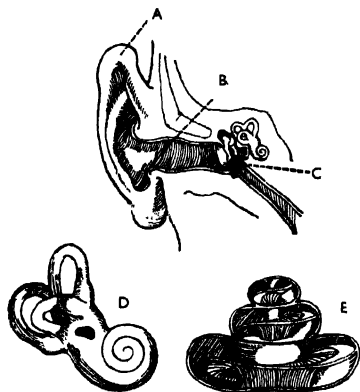
E. A. M. (Ellinikon Apelevtherotikon Metopon), Gk. resistance movement or 'National Liberation Front' in Second World War. See under GREECE.

Eames, Emma (b. 1867), Amer. prima donna, b. at Shanghai, China; studied at Boston, Massachusetts, and Paris. Made her début at Covent Garden in 1891.

Ear. The E., the organ of hearing, is divisible into three parts: (a) the external; (b) the middle; (c) the internal. The most important portion is the internal E. or *labyrinth*, the other two can be considered merely as accessories to this, their function being the collection and transmission of the sound waves so that the sentient portion of the organ may be affected. The parts will be described from the exterior inwards. The external E. consists of two parts, the *pinna* and the *meatus*. The former is a broad, peculiarly shaped, and for the most part, cartilaginous plate, concave on the whole, but thrown into various elevations and hollows to which distinct names have been given, the largest and deepest hollow being the *concha*, which surrounds the entrance to the meatus. The variety of contour is to ensure that the sound waves collected within the rim of the pinna are reflected into the external auditory canal, somewhat similar to the action of the Whispering Gallery of St. Paul's. The pinna is also used to ascertain the direction from which the sound is coming. The meatus, about 1½ in. in length, has an outer cartilaginous portion with many fine hairs and a large number of sebaceous glands which secrete *cerumen* or E. wax. The innermost half of the tube enters the temporal bone which encloses the middle and internal E. The meatus is first directed upwards and then, narrowing in diameter, surmounts a convexity in the floor of the osseous part to dip downwards and widen again to its termination at the obliquely placed *membrana tympani* or *drum*.

The middle E., or *tympanum*, is a narrow, irregular cavity varying in width from ½ in. to ¾ in. between the tympanic membrane and the outer bony wall of the labyrinth. Its enclosed air is in direct communication with the pharynx (throat) by means of the Eustachian tube. This arrangement ensures that the cavity is kept supplied with renewed air at the same pressure as that of the external E. so that the drum is able to vibrate freely.

It contains a chain of small bones which convey the vibrations across the cavity to the middle E. The *membrana tympani* is an ellipsoidal disc about 0.37 in. by 0.33 in., and about $\frac{1}{16}$ in. thick. To its inner surface is attached the handle of the first bone (the *malleus*, or hammer), the rounded head of which fits into a corresponding hollow in the second bone (*incus*, or anvil), and this in its turn articulates with the *stapes*, or stirrup, which fits into the *fenestra ovalis* of the internal E. The *fenestra rotunda* separates the *scala tympani* from the middle E. The complicated ligament and muscle attachments of the chain of bones ensure an exact reproduction at the *fenestra ovalis* of the highly complex movement of the tympanic membrane.



PARTS OF THE EAR

A, pinna; B, meatus; C, eustachian tube; D, cochlea and semi-circular canals; E, section of cochlea.

The internal E. is contained in the petrous portion of the temporal bone and consists of a complex cavity, the osseous labyrinth (auditory capsule), hollowed out of the bone and containing the *membranous labyrinth*. The former is incompletely divided into three parts, viz. the *vestibule*, the *semicircular canals*, and the *cochlea*; the membranous labyrinth is smaller, and the space between the two is occupied by *perilymph*, while *endolymph* is contained in the inner labyrinth. The vestibule forms the central chamber of the labyrinth and communicates in front, by means of a large opening, with the cochlea, and behind, by means of five smaller openings, with the semicircular canals; its outer wall is penetrated by the *fenestra ovalis* mentioned above. The semicircular canals are three tubes differing from one another in direction, length, and position with regard to the vestibule; they are arranged in three planes mutually at right angles, and whatever may be their function in hearing they are certainly of

the greatest importance in the guidance of co-ordinated movement so that bodily equilibrium may be maintained. Each canal is about $\frac{1}{8}$ in. wide, but each is dilated at one end forming an *ampulla* about $\frac{1}{4}$ in. in diameter, and on each ampulla is a crest or ridge (*crista acustica*) projecting into the cavity of the canal and consisting of *auditory epithelium*, which contains distributed filaments of the auditory nerve. The *cochlea* (Lat. a snail shell, from its spiral shape) appears in the form of a blunt cone about $\frac{1}{2}$ in. in height and the same in breadth at the base. It consists of a gradually tapering spiral tube of $2\frac{1}{2}$ turns and some $1\frac{1}{2}$ in. in length, the inner wall of which is formed by a central column, or *modiolus*, from which projects a spiral lamina along the whole extent of the cochlea. The membranous labyrinth consists of structures lined throughout by epithelium, and at certain parts receives branches of the auditory nerve. In the vestibule and canals the structures have a general resemblance in form to the complicated cavity in which they are contained. They do not, however, lie loose within the osseous labyrinth, but along the convex border of the canals, and at the places of entrance of the nerves into the vestibule and ampullae they are fixed to its walls. In the cochlea the membranous structures complete the septum and enclose an intermediate cavity. In the osseous vestibule there are two membranous sacs: (a) the *utricle* (Lat. *utriculus*, a small bladder), connected with the canals, and (b) the *saccul*, connected with the cochlea; these sacs are only in indirect communication with one another. Both contain small masses of calcareous particles (*otoliths*) which are set in movement by vibrations, and they also contain patches of auditory epithelium with nerve filaments. The cavity of the osseous cochlea is divided into three distinct parts: *scala vestibuli*, *scala tympani*, and *canalis cochleae*, by means of two membranes: (a) the *basilar*, and (b) the more delicate *membrane of Reissner*, the oblique direction of which latter causes the smallest portion, the cochlear canal, to have a triangular section; this is in communication with the saccul and contains endolymph, whereas the other two *scala* contain perilymph. The cochlear canal is highly complicated, and only a brief description is possible here. The most important structure of the floor of the cochlear canal, that is, on the basilar membrane, is the so-called organ of Corti, which consists of rods of Corti. There is an inner row and an outer row all along the spiral, each row containing sev. thousand rods, flanking the rods are rows of cells (sev. thousands in each row), each cell bearing short hairs on its free surface, and the auditory nerves passing through the lamina spiralis reach the cochlear tube along the whole length of the spiral and end in filaments which are lost in the organ of Corti, but are probably connected with the hair cells. It is thought that the cochlea distinguishes pitch and timbre in notes. What takes place in hearing may be summarised thus:

The vibrations set up by a sounding body are conducted by the accessory apparatus to the perilymph through the membranous sac, thence to the endolymph. The vibrations in time reach those particular places containing auditory epithelium, and set the auditory hairs or the otoliths in movement, and so excite the delicate filaments below, which causes impulses to pass along the auditory nerve to the brain.

Deafness and diseases of the ear.—The most common affection of the E. is deafness, which is of various types. An impacted plug of wax will cause it, and should be removed by syringing, which however must be carried out with care. It is best to drop a few drops of hydrogen peroxide or liquid paraffin into the E. for two or three nights before syringing, in order to soften the wax. A *furuncle* or boil may also cause deafness, but the diagnosis must be made by a doctor, as it may be confused with other more serious conditions, such as mastoid inflammation. By far the greater number of cases of deafness, however, are caused by affections such as catarrh of the middle ear or Eustachian tube, which, if not properly treated at an early stage may proceed to chronic catarrh. *Adenoids* are a common cause of deafness among children. *Otosclerosis* also brings middle-ear deafness, and is due to obscure changes in the bony labyrinth, but unhappily neither its cause or cure is known. Other diseases include *Otitis Media*, or inflammation of the middle ear; ear-ache, caused by inflammation of the middle ear, or the presence of a foreign body; *Otorrhea*, chronic suppuration of the middle ear; and *nerve-deafness*, due to an affection of the cochlea or the acoustic nerve.

Earheart, Amelia (Mrs. G. Palmer Putnam) (1898–1937), Amer. social services worker and air-woman, b. in Atchison, Kansas. Was the first woman to fly the N. Atlantic, flying as a passenger from Newfoundland to Burry Port, Wales, in 1928. She served with the Red Cross during the First World War and subsequently directed a social service centre in Boston. Flew from Newfoundland to Ireland in 13½ hrs., 1932; and made the first solo flight from Honolulu to Oakland, California, doing the journey in 18½ hrs., in 1935. In July, 1937, when attempting a flight round the world, she was lost at sea with her navigator, Capt. Noonan, near Howland Is.

Earl, title of Brit. nobility, between a marquis and a viscount. It was during the Norman period that this title first became hereditary, and for some time they were called counts, and their wives in the present day are called countesses. The title of E. was the highest hereditary dignity until the reign of Edward III., who created his eldest son 'Duke' of Cornwall, 1337. The eldest son of an E. bears the title of 'viscount,' while the younger sons are styled 'honourable.'

Earle, John (1824–1903), Eng. philologist and clergyman, professor of A.-S. at Oxford, 1849–54; re-elected, 1876. He became rector of Swanswick in 1857,

prebendary of Wells (1871), and rural dean of Bath (1873–77). His works include: *Two of the Saxon Chronicles Parallel* (1865), *A Book for the Beginner in Anglo-Saxon and The Philology of the English Tongue* (1866), *Anglo-Saxon Literature* (1884), *English Prose, its Elements, History, and Usage* (1890), *The Psalter of 1539* (1894), *A Simple Grammar of English now in Use* (1898), *The Alfred Jewel* (1901).

Earle, William (1833–85), Eng. soldier, served in the Crimea. He became military secretary to Lord Northbrook, viceroy of India (1872–76), commander of the garrison of Alexandria during Wolseley's campaign (1882–84), and led a column of the Gordon rescue expedition (1881). While leading his detachment against the Arabs at Kirbekan, he was killed. A memorial statue was erected in Liverpool. See Sir H. Brackenbury, *The River Column*, 1885.

Earlestown, eccles. par. of S. Lancashire, England, 5 m. from Warrington, with railway wagon works, and a sugar refinery. Pop. 11,000.

Earl Marshal of England. The king's marshal (A.-S. *nearh* and *seate*, groom) became early one of the chief officers of state, and, under the Norman and Plantagenet kings, judge in the Courts of Chivalry. Since 1672 the office has been hereditary in the family of Howard (dukes of Norfolk). The earl marshal is now head of the Herald's College in England, regulates all matters connected with armorial bearings, standards, etc., and controls the arrangements for state functions, such as royal processions, drawing-rooms, balls. In Scotland a similar dignity was hereditary in the family of Keith from the fourteenth century till 1716.

Earlom, Richard (1743–1822), Eng. mezzotint engraver, a pupil of Cipriani. He was the first artist to make use of the point in mezzotint work. He engraved plates after Rembrandt, Vandyck, Correggio, and others; the six after Hogarth's 'Marriage à la Mode' are well known. 'Fruit and Flowers,' after J. van Huysum, made his reputation, and 'Bathsheba leading Abishag to David' won much praise. His patron, Boydell, pub. the 'Liber Veritatis,' 1777, with a series of prints from the originals of Claude Lorrain.

Earl's Court, part of the metropolitan bor. of Kensington, London, England, on the District Railway and Piccadilly Tube, with a large hall used for exhibitions and entertainments.

Earlston, Errolsdoun, or Errolsdoun, par. and mkt. tn. of Berwickshire, Scotland, on Leuder Water, 4 m. from Melrose. Tweeds, ginghams and other textiles are manu., and there are dye-works. Ruins of an auct. tower remain, the traditional abode of Thomas the Rhymer (thirteenth century). Pop. 2000.

Early Closing. The movement for reducing the working hours of shop assistants was inaugurated in 1842, since which year the compulsory weekly half-holiday, the introduction of 'summer time,' and other reforms have appreciably improved their conditions. The provisions of the

Shops (Early Closing) Act, 1920-21, were permanently adopted in 1928. The Act states that for only one day weekly may a shop remain open until nine o'clock, and on the remaining evenings it must close no later than eight, although customers inside the doors before closing time or anyone requiring some article urgently in case of illness may be served. Exemptions are given in respect of exhibitions, seasons such as Christmas, while special provisions are made for holiday resorts and sea-fishing centres. The occupier of a shop breaking the law is liable to a maximum fine of £5 for a first offence, and £20 for any subsequent offence. The President of the Early Closing Association is Mr. Winston Churchill, and its Secretary, Albert Larking, C.B.E.; the head offices are 1-3 St. Paul's Churchyard, London. See SHOP ACTS.

Early, Jubal Anderson (1816-94), Amer. Confederate general, practised law from 1838-61. He served in the Florida War (1837-38), and in Mexico (1847-48). In the Civil War he commanded a brigade at Bull Run (1862), and distinguished himself at Williamsburg, Antietam, Fredericksburg, Chancellorsville, and Gettysburg, commanding part of Lee's army. After some successes in the Shenandoah Valley, he was defeated by Sheridan (1864), and by Foster at Waynesborough (1865). He wrote *A Memoir of the Last Year of the War for Independence in the Confederate States* (1867). See G. Pond, *The Shenandoah Valley in 1864*, 188.3.

Early English Text Society, founded in England by Frederick James Furnivall, 1864, in connection with the Philological Society, as were also the Chaucer and Ballad Societies of 1868, and the Wyclif Society of 1882. For these societies Furnivall ed. many works, such as *Saint Graal* (Eng. verse by Lancelot, 1440 (1861-63); Walter Map's *Quest del Saint Graal* (1864), and *The English Conquest of Ireland, 1165-85*, from Giraldus Cambrensis (1896). The aim is to increase knowledge of O. E. writers.

Early Old English, see under ENGLISH LANGUAGE.

Earn, loch of Perthshire, Scotland, about 6½ m. long by 1 m. broad, and about 300 ft. deep. On the S. is Ben Vorlich, a mt. of 3224 ft. and Ardvorlich House is the 'Darnlinvarach' of Scott's *Legend of Montrose*. The riv. issues from the loch, flows E. through the well-wooded valley of Strathearn, past Comrie, Crieff, and Bridge of E., a watering-place near the saline springs of Pitcaithly. The E. finally joins the Tay near Abernethy, about 6 m. from Perth.

Earnest (Scottish, *arles*), trifling sum of money or token given to 'bind the bargain' of a sale or agreement, marking the assent of both parties to a contract. A practice of great antiquity, it is still sometimes observed in England and Scotland. It is not quite the same as part payment, for in the case of E. proper, or 'dead E.', no allowance is made later for the value of the token given beforehand by the purchaser.

Ear-ring, strictly a ring worn as an ornament suspended from the lobe of the ear, which is pierced for the purpose. The custom of wearing Es. has existed among the Orientals from the earliest times. It was common to both sexes among the Asiatic races (Persians, Babylonians and Carthaginians), but reserved for women only among the Gks. and Roms. In Elizabethan times in England, Es. were still worn by men, and sailors sometimes continue the custom. This form of jewellery is not now so universal in Europe as formerly. The two chief kinds are a jewelled stud fitting closely to the lobe, or a drop or pendant hanging from a gold loop.

Ear-shell, see HALIOTIS.

Ear Stones, see OTOLITHS.

Earth (A.-S. *eorthe*), the planet on which we live. The term is also used to denote the solid portion of the globe, in particular the uppermost layer, consisting of disintegrated rock and organic particles loosely bound together, otherwise known as soil. The early chemists recognised four elements: fire, air, water, and E., of which all other substances were thought to be mixtures or modifications. In modern chemistry the term persists as applied to certain metallic oxides. The older chemists gave the name E. to non-metallic substances which were insoluble in water and were not affected by high temps. As many of them had an alkaline reaction they were known as alkaline Es., but subsequent investigations have shown that each such E. is a compound of a metal and oxygen. The term alkaline E. is now restricted to lime, strontia, and baryta, these being oxides of calcium, strontium, and barium. There is another extensive group of oxides known as the rare Es. They occur in sev. rare minerals found in Scandinavia, Siberia, Greenland, and N. America, and are employed in the manuf. of mantles for incandescent gas lamps. The chief metals of the rare Es. are scandium, yttrium, lanthanum, didymium, terbium, and erbium.

The Earth as planet.—The E. is a member of a group of bodies distinguished from other bodies in the universe by their motion around one member of the group, the sun. The central body, or sun, is the only member of the group, as far as we know, which shines by its own light. The other bodies consist of planets which move in elliptical orbits about the sun, and satellites which revolve around certain of the planets. The planets, in order of nearness to the sun, are Mercury, Venus, the Earth with its satellite the moon, Mars, with two satellites; then come a vast number of minor planets or asteroids, and outside of these the larger planets, Jupiter, Saturn, Uranus, and Neptune, with seven, ten, four, and one satellite respectively. The path of the E.'s motion round the sun, that is of its *revolution*, is an ellipse of which the sun forms one focus. The mean distance of the E. from the sun is about 93,000,000 m., and the eccentricity of the orbit is about 3,250,000 m. The plane of the orbit is called the ecliptic, and it is inclined to the E.'s

equatorial plane at an angle of $23\frac{1}{2}^\circ$. The time which the E. takes to make a complete circuit is known as the solar year, and measures 365 days 5 hrs. 48 min. 46 sec. The E. has another movement, rotating about its own axis, thus causing points on the E.'s surface to have periods of sunlight alternating with the periods of darkness. Owing to the inclination of the E.'s axis to the plane of the ecliptic, some places are presented to the rays of the sun more directly than others; this causes the phenomena of the seasons. Also places in high latitudes are presented for longer periods to the sun's rays according to the position of the E. in its orbit; this accounts for the variations in the lengths of day and night in those latitudes. The E. is nearly spherical in shape. The ancients believed it to be a flat disk, and the belief persisted in the popular mind for many centuries. Pythagoras, however, asserted that the E. was spherical and his view was strongly supported by Aristotle, who employed many of the arguments current to-day. The horizon becomes wider as the position of a spectator becomes more elevated, the E. always throws a circular shadow on the moon when it is in eclipse, and the lower part of a receding object is the first to disappear. The E. is, however, not a perfect sphere. In the seventeenth century Jean Richer observed that a clock which kept perfect time in Paris lost about $2\frac{1}{2}$ min. a day at Cayenne, and the pendulum had to be shortened in order to correct the error. Newton explained the occurrence by showing that the attraction due to gravity was less at the equator than in more northerly latitudes owing to an increased distance from the E.'s centre of gravity. This conclusion received confirmation by experiments with delicate spring balances, which registered less weight for a given mass in equatorial than in regions of higher latitudes. It was also observed that the length of a degree of latitude is greater towards the poles than near the equator. The degree is readily indicated with great accuracy by astronomical methods, and its length being determined by careful E. measurement showed beyond doubt that the E. is flattened at the poles. The amount of the flattening is not great, the extent by which the polar diameter is less than the mean equatorial diameter being about one two hundred and ninety-eighth part of its length. The equatorial section of the E. is also slightly elliptical. The approximate length of the polar diameter is 7899 m. and the mean length of the equatorial diameter is about 7926 m., giving a difference of 27 m. approximately. The mass of the E. is given by the most recent researches as 6,000,000,000,000,000,000 tons. The mean density of the earth is computed as about 5.5, the density of pure water at 4° C. being taken as unit. The planet E. is a great magnet. If a magnetic needle is placed upon a pivot so as to oscillate freely it takes up a position which is approximately N. and S. The N. and S. poles of the E. considered as a magnet are some distance from the poles of the

rotatory axis and are liable to secular variation of position.

Origin and history of the Earth.—No theory of the origin of the E. has been generally satisfactory. The nebular hypothesis, which appears to be most in favour, states that the solar system was at one time a great mass of vapour, in which a central nucleus was gradually formed. This nucleus, which is represented by our sun, cast off the less central portions of the mass, which cooled down to form the present planets. The satellites were thrown off from the planets in the same way as the planets separated from the parent sun. There is certainly abundant evidence that the E. was at one time at a much higher temp. than to-day. The gradual rise of temp. on descending towards the E.'s interior suggests that the innermost regions are still at an enormously high temp. The existence of volcanoes which pour out molten rock and hot gases is taken by some as sufficient evidence that the interior is still in a fluid condition, and that the crust is a solidified envelope of comparatively little depth. Physical facts are, however, rather against the likelihood of a permanent gaseous or molten interior, and some scientists have gone as far as to say that the amount of radium in the E. indicated by the discoveries fairly near the surface is sufficient to account for almost any degree of temp. Attempts have been made to compute from geological, physical and other data the length of the period during which the E. has been in a solid state. Lord Kelvin based his hypotheses on arguments derived from consideration of three kinds of data. By judging the rate of the loss of heat from this planet, he placed the limits of not less than 20,000,000 years and not more than 400,000,000 years, as the length of time from the first superficial solidification of the E. to its present condition. From estimating the amount of retardation of the E.'s rotation due to tidal friction he judged that the E. became consolidated not much more than 100,000,000 years ago. Thirdly, by calculating the probable age of the sun's heat, he brought down his estimate of the age of the E. to about 20,000,000 years. Geologists, however, are disinclined to accept any period less than 100,000,000 years as sufficient for the elaboration of the present structure of the E. It is indisputable that many millions of years, probably thirty or forty, must have elapsed while the great sedimentary rocks were being deposited. With respect to the larger features of the E.'s surface, it is likely that two different kinds of movement are responsible. Where the contraction of the E. has caused a lessening of the support below the surface, there has been a subsidence of great areas. In the second place, where the rigid crust has been able to contract into a smaller space, great ridges and folds have been formed, showing marked continuity and parallelism. The subsidences which caused the ocean appear to have taken place at different ages. The Atlantic Ocean probably dates from

middle Cainozoic times; the Indian Ocean may be older, and the Pacific, whether a subsidence of great antiquity or not, has certainly suffered great modifications in comparatively recent times. Akin to the general discussion of the age of the E. is speculation concerning its future. The gradual loss of energy which has diminished the speed of rotation of the E. and caused its cooling and condensation is still going on. The constant operation of tidal friction will cause it to rotate more and more slowly, and the gradual cooling of the sun itself, if not fed by meteors from outer space, will inevitably diminish the amount of energy in the system. A time will come, many millions of years distant, when the members of the solar system will return to their anct. nucleus, and by the force of their impact will establish a nebula of sufficient energy to proceed upon another cycle of planet formation.

Structure of the Earth.—The E. consists of an outer gaseous envelope, the *atmosphere*; a middle layer of water, the *hydrosphere*, occupying the hollows in the surface of the globe; and a central core of solid material, the *lithosphere*. In the course of its solidification, the lithosphere developed ridges, which are represented by the great mt. ranges, and subsidences, which are represented by the great oceans. The progressive cooling had its consequence in stresses in various parts of the surface of the lithosphere which took effect in various movements, sudden occasionally, but long sustained for the most part, and so the general shape of the E. was and is constantly changing; in places the land is gradually lifted above the sea, while other lands are gradually submerged, only to reappear in a later age. There are other agencies at work tending to change the form of the E. The disintegrating forces of frost and water action gradually wear down the older rocks, while the deposition of the débris, mixed with relics of organised life, builds up layers of sedimentary rock. The oldest sedimentary rocks, known as Archaean, contain no traces of life. The sedimentary rocks containing fossils are divided into four main groups: the *Paleozoic*, containing such formations as the Cambrian, the Old Red Sandstone and the Coal Measures; the *Mesozoic*, containing the great chalk layers; *Tertiary*, containing friable rocks rich in fossils; and the *Quaternary*, consisting of sands, gravels, and clays of recent formation. The study of the crust of the E. is the aim of the science of *geology*. In *geography*, the surface of the E. is considered; its div. into continent and ocean, the features of the land masses, mountains, rivs., plateaux, plains, etc., the distribution of life on the globe, the manner in which the various sections of the human race have grouped themselves, the nature of their govts., their industries, their cities and tns., roads of communication, commerce and mrkts. *Astronomy* deals with the E. as a planet, its movements, and the methods of accurately measuring them. The measuring of the surface of the E. is the concern of *Geodesy*. The constitution of the various

rocks is dealt with in *Mineralogy* and *Chemistry*. The constitution and phenomena of the atmosphere are the business of *Meteorology*. The hydrosphere is studied under the name of *Oceanography*. See also OCEAN AND OCEANOGRAPHY.

See J. H. Poynting, *The Earth*, 1922; E. Huntingdon, *Earth and Sun*, 1923; G. A. Baltzell, *Evolution of the Earth*, 1929; V. A. Heiskanen, *On the Figure and Structure of the Earth*, 1941; J. A. Ryder, *Mother Earth*, 1948.

Earth-closet, see under SEWAGE.

Earth Currents. The discovery of E. C. was made after the introduction of telegraphy. They arise from a variety of causes, viz. (i.) electro-chemical action in mineral deposits, (ii.) electric waves such as wireless waves, (iii.) electric railways, etc., and (iv.) telegraph lines are traversed by E. C., and were discovered by C. V. Walker and W. H. Barlow in England, and the latter E. C. are the most noteworthy. If two metal plates are sunk in the earth at some distance from each other, and then connected by a wire, E. C. flow from one plate to the other, and may be detected by a delicate galvanometer placed in the circuit. The potential difference between the plates may be as much as 20 millivolts per kilometre distance between them. This P.D. varies daily, and indeed may cause serious interference with the transmission of messages. The lines running from N.E. to S.W. in England are the principal sufferers from E. Cs. Within recent years prospectors for mineral deposits have made use of E. Cs. set up in a wire joining two plates embedded in the earth. The presence of such mineral deposits decreases the electrical resistance of the return earth circuit and by shifting the plates it is possible to locate the deposits by the large increase in the E. Cs. traversing the circuit.

Earthenware, see POTTERY.

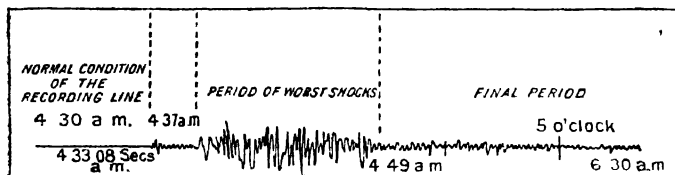
Earth-house, or Yird-house, the usual name throughout Scotland for archaic underground buildings, also known as 'Picts' dwellings,' 'weems,' 'coves' or 'caves.' Examples remain in the Brit. Isles (especially in N.E. Scotland), in Nebraska, Kansas, and the W. states of N. America, where they are called 'dug-outs'; in Austria, Germany, and other parts of Europe, and in Armenia and Egypt. Aristotle, Xenophon, and Strabo gave descriptions of structures of the kind, which are evidently of very anct. origin, though it cannot be definitely settled by whom they were first built. They are perhaps of Celtic origin in the Brit. Isles. Very similar are the adobe dwellings in California and the dome-shaped snow-huts of the Eskimos. Es. existed also in Asia and in Japan, especially in Korea and the N. An E. usually consists of a single irregular chamber of unewn stones, the sidewalls gradually converging towards the top till only a space of from 4 to 5 ft. remains to be spanned by rough flag-stones. A passage or gallery (8-10 ft deep) leads to the room, getting wider and higher as it proceeds from the entrance. The roof was often only 1 ft below the surface, and the whole was covered in by

earth, sometimes raised very slightly in a mound above the level of the surrounding district. In later times there were often two or three rooms connected with each other. A few such houses were dug out of hard soil or chalk, and had no stonework. Various implements of flint, bone, or metal are the chief remains found in them. Clovanor near Alford, Aberdeenshire, and Crichton, Midlothian, possess specimens belonging to post-Roman times. See M. Martin, *Description of the Western Islands*, 1703; J. Anderson, *Scotland in Pagan Times: the Iron Age*, 1883; Kärner, *Künstliche Höhlen aus alter Zeit*, 1903.

Earth-nut, see GROUND-NUT.

Earth-pillar, pillar of earth or soft rock capped by a large boulder or some harder material, such as sandstone or limestone. These columns are formed by the action of rain on a mass of soft, stony clay, and the washing away of softer substances beneath cracks formed in the cap of rock. They occur in the moraines of glaciers,

The nature of E. movements has been studied by the aid of self-recording instruments called *seismometers* (q.v.). The movements consist of series of waves, which appear to be of two distinct types. The first type consists of waves of elastic compression proceeding from a centre of disturbance in much the same way as waves of sound are propagated in air by a vibrating body. The centre of disturbance is some point, or rather assemblage of points, at some distance below the surface of the earth's crust, and from this the waves proceed in all directions, thus giving the form of a series of spherical or spheroidal shells with a common centre or focus. The amplitude of the wave is the distance which each particle moves from its mean position; the period is the time required to complete each oscillation. The greater the amplitude and the less the period, the more violent are the effects at the surface of the earth. Other waves exist which move in a direction transverse to the direction of propagation of the



SEISMOMETER RECORD OF THE MESSINA EARTHQUAKE (1908)

boulder-clay, and similar formations, and are from 30-100 ft. high. Examples are found in the 'bad lands' of W. N. America, in the 'Garden of the Gods,' in Colorado, and at Bolzano (Tyrol). There are also specimens at Fochabers in Scotland and elsewhere.

Earthquake, trembling or shaking of the earth. The intensity of the phenomena associated with seismic disturbances may vary from a slight tremor only perceptible with the aid of delicate instruments to a great convulsion accompanied by considerable changes in the surface structure of the earth, with consequent destruction of much life and property. Great E. may or may not be heralded by preliminary tremors. These are followed by a shock or a series of great shocks extending over a few minutes, during which buildings are cracked and huge fissures appear in the earth. This is the period of greatest destruction, unless the advent of a huge sea-wave carrying with it large masses from the shore makes the havoc more complete. After the main shocks comes a series of minor disturbances, which may extend for many weeks or even years, gradually diminishing in intensity and frequency. In many cases observers have testified to the existence of sound-rumblings unconnected with any visible displacement of E., gradually increasing to a maximum and then decreasing to silence.

waves of elastic compression. These are due to a change of shape in the medium in which the waves are propagated. The point of the surface immediately above the focus is called the epifocus, and it is here that the effects of the wave are most immediately felt, a vertical shock being sustained. Further away from the epifocus the shocks are more oblique in their direction. Much valuable work in the determination of the seat of disturbance in E. was done by Robert Mallet (1810-1881), who derived his conclusions from the direction of cracks in damaged buildings. Proceeding from the assumption that the direction of the fracture was in general at right angles to the direction of the wave, he obtained a series of directions, the intersection of which would give the position of the centre of disturbance. Other methods of determining the depth of the focus have since been elaborated, notably that employed by Maj. Dutton in connection with the Charleston E. of 1886. This depends upon the determination of an 'index-circle.' Over a great area surrounding the scene of the E. isoblastic lines were drawn connecting those points where the vibration felt was observed to be equal in intensity. The 'index-circle' was defined as the curve joining the points where the intensity suddenly diminished. Theoretical considerations showed that

the focal depth was obtained by multiplying the radius of the index-circle by the square root of three. Such determinations are made with difficulty, because although the waves are theoretically propagated in spherical or ellipsoidal form from the focus, the heterogeneous nature of the structure of the earth's crust causes many disturbances of direction, the waves being refracted and reflected by masses of varying density and elasticity in the medium.

The cause of Es. may be broadly explained by reference to the contraction of the outer crust of the earth due to the cooling of the planet. The crust itself possesses a certain amount of rigidity, but the contraction of the interior occasions differences in the amount and distribution of the support afforded to the crust by the underlying structures. Hence there occur subsidences accompanied by the fracture of strata, or folding movements generally bearing some relation to the direction of folds on the earth's surface. Thus the greater proportion of observed Es. appear to take place in regions where there is a sudden slope towards a great depression, as on the Pacific coast. Generally speaking, the more violent manifestation of E. action may be located on two great circles, the one encircling the Pacific Ocean, and the other following the great depression of which the Mediterranean forms a part.

The effects of Es. are immediate and permanent. The immediate effects include the widespread destruction of life and property, often exceeding in extent the effects of the most disastrous wars. The more permanent effects are due to changes effected or induced in the surface of the earth's crust. Thus the elevation or depression of an area by only a few feet may lead to great changes in the drainage system of the country, with consequent far-reaching effects on its economic condition. Though occasionally a displacement may lay bare some hitherto hidden source of mineral wealth, the general consequences to a country of its position in an E. belt are fraught with danger to its economic prospects and the moral condition of its inhabitants. It is perhaps for this reason that Japan has been for many years the foremost of all countries in the world in its encouraging attitude towards seismological research. But some Es. are harmless, e.g. in Johannesburg, where they are of common occurrence, and do no more than rattle teacups. They appear to be due to the removal of ore in the gold mines to the S. of the city, causing the fall of rock formerly supported.

Notable earthquakes.—Among Es. of particularly disastrous effects are the following: Lisbon (1755), when from 30,000 to 40,000 lives were lost; the greater part of the city was wrecked, fire broke out, and a tidal wave swept over the quays and destroyed the shipping; property was destroyed to the value of £20,000,000; Calabria (1783), when 60,000 lives were lost; Aleppo (1822), 20,000 lives lost; Naples (1857), 12,000

lives lost; Peru (1868), 25,000 lives lost; Krakatoa, where the E. was accompanied by a volcanic disturbance by which the is. was completely destroyed; Charleston (1886), where almost every building was damaged; India (1896), when Assam was devastated; Mont Pelée (1902), 20,000 lives lost; India (1905), where a disturbance spread from Kangra over an area of 1,500,000 sq. m., causing the loss of 20,000 lives; California (1906), when a large portion of San Francisco was destroyed; Valparaiso (1906), 2500 lives lost; Messina (1908), when Messina, Reggio, and many vills. were totally destroyed, with a loss of life estimated at 77,283. Japan suffered its worst disaster on Sept. 1, 1923, when an E. followed by a tidal wave and fire destroyed the cap. city, Tokyo, one of the world's largest cities, and Yokohama, the chief port. Casualties were 246,540, of whom 103,733 were injured, 99,331 killed, and 13,176 missing and probably all killed; 447,128 houses were destroyed by fire, and 128,266 by collapse. On July 23, 1930, the region near Naples had one of its worst Es.: 2142 persons were killed and 1551 were injured. In March 1931 Nicaragua had an E. which destroyed the cap. city of Managua, hundred of persons being killed and injured. In 1935 Quetta, in Brit. Baluchistan, was destroyed by an E. and the work of restoration of the military cantonments took a number of years. Montserrat in the W. Indies had a series of small Es. in 1936. Turkey suffered a series of Es. in Anatolia in Jan.-Feb. 1940, involving the death of over 30,000 persons, Erzingan being almost wholly demolished.

See J. Milne, *Seismology*, 1898, and *Earthquake*, 1898; C. E. Dutton, *Earthquakes in the Light of the New Seismology*, 1904; C. Davidson (a great authority on the subject), *A Study of Recent Earthquakes*, 1905; *A Manual of Seismology*, 1905; *The Origin of Earthquakes*, 1912; *A Manual of Seismology*, 1921; *A History of British Earthquakes*, 1925 (the best book of its kind, citing 1191 earthquakes ranging over nearly 1000 years); and many other works including H. Jeffreys, *Earthquakes and Mountains*, 1935; *The Japanese Earthquake of 1923 and Studies of the Periodicity of Earthquakes*, 1936; *Great Earthquakes*, 1936.

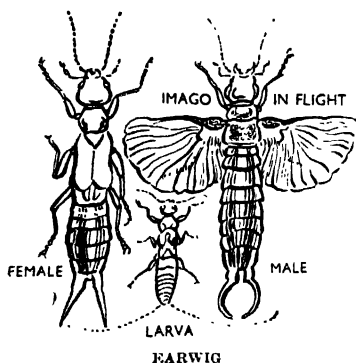
Earth-shine, light reflected from the earth's sunlit surface to the moon, causing the dark parts of her surface to become slightly luminous (with a reddish tinge) for a few days before and after new moon. The appearance popularly described as 'the old moon in the new moon's arms' (the whole surface being visible in ashy-coloured light) is a result of the E.

Earthworks, mounds or walls of earth, or earth and stones, for purposes of defence, the marking of boundaries of political or agric. units of land, and for surrounding a burial ground or settlement. See BARROW; CAIRN; CASTLE; FORTIFICATION; HILL-FORTS; OFFA'S DYKE; ROMAN REMAINS IN BRITAIN.

Earthworms belong to a div. of Annelids called Oligochaeta. They are found in all parts of the world, though naturally

they do not thrive in arid tracts; and their effect upon the fertility and drainage of the soil can hardly be calculated. Burrowing into the ground, they cast up the earth they have swallowed, and so pursue a constant and thorough system of ploughing. Though eyeless, they evade the light and only come out of their burrows at dusk, often remaining, even then, with their tails in the holes and their bodies working round and round. The Brit. E. are confined to the Lumbricidae, and are usually about 6 in. long, with a pointed head, rounded body and slightly flattened tail. The *Allotobophora*, which are largely distributed over England and Ireland, are also found in the Arctic regions, and are the only E. capable of burrowing through snow and ice; *Lumbricus terrestris*, the common E., and *L. feticidus*, the dunghill worm, represent another genus; and *Allurus*, the remaining genus, are equally at home on earth or in water. Some tropical species of E. reach a gigantic size, those found in Central Africa, Australia, and Ceylon growing to a length of 3 to 6 ft.

Earwig, name given to certain species of Forficulidae. *Forficula auricularia*, the common E. is found all over Europe, and is regarded by horticulturists as a great pest, as it feeds on young shoots, the petals of flowers, and the flesh of soft, ripe fruit.



the name arises from a popular but erroneous idea that this insect will crawl into the ear and remain. The E. is gregarious and nocturnal, and makes its home under stones, beneath the bark of trees, or in almost any dark hole or crevice. The larvæ, when hatched, cluster round their mother, whom they closely resemble, except for the lack of wings.

Easdale, small is. on the W. coast of Argyllshire, Scotland, in the firth of Lorne. It is 1½ sq. m. in area, and is noted for its primary slate quarries, belonging to the Earl of Breadalbane.

Easements form one of the class of rights called incorporeal hereditaments (*q.v.*) (and see also **GRANT**). E. consist of those rights in the nature of privileges or

conveniences without profit which one or more persons have in, or over, the land (*q.v.*) of another, as *e.g.* a right of way or a watercourse (see **LAND LAWS**). E. are usually annexed or appurtenant to the ownership of a particular piece of land (the dominant tenement), and are said to be *affirmative* if the owner of the *servient* tenement must *allow* the owner of the *dominant* tenement to do something, as *e.g.* to use a right of way across his land; *negative* if he must *refrain from doing* something, as blocking up the 'ancient lights' of the other. E. consist chiefly of rights of way, watercourse, and light (see **LAND LAWS**), but any right over the land of another which is not 'capricious,' *e.g.* a right to increased lateral support for land weighted with buildings, and a right to access of air for one's chimney or window is an E. A right to light may be defeated by blocking access to light, unless the right arose by express grant or by prescriptive title or user of twenty years. E. arise either by (1) custom, *e.g.* where villagers have been accustomed for a number of years to use a pathway over a piece of land; (2) grant; (3) prescription, either at common law, *i.e.* where the right has been enjoyed from the time of legal memory (accession of Richard I.); or under the Prescription Act, 1832, which makes an uninterrupted user for twenty to forty years respectively, *prima facie* evidence (*q.v.*) of the right to a way or watercourse, and twenty years as uninterrupted user conclusive of a right to light; (4) necessity, *i.e.* where absolutely necessary to the reasonable enjoyment of a tenement, *e.g.* if A sells B a piece of land entirely surrounded by other land of A's, a right of way in B is necessarily implied over the surrounding land. E. are lost by non-user for twenty years, by express release, or, of course, by reason of the dominant and servient tenements falling into the possession of the same person.

East, quarter of the horizon where the sun rises, when in the equinoctial. From very early times the E. has been clothed in a certain sacred mystery, and it was the custom of many of the pagans, as it is generally among christians, to build their altars in the E. part of the temples, so that they could offer their sacrifices towards the rising sun. Hence arose the custom of turning towards the E. for prayer, also the practice of laying the dead with their feet toward the E.

East, Sir Alfred (1849-1913), Eng. painter and etcher, b. at Kettering, studied art in the Glasgow School of Art, and later at the Ecole des Beaux-Arts in Paris, where he received lessons from Bouguereau. A.R.A., 1899. In 1906, the year when he pub. his *Landscape Painting in Oil Colour*, he was chosen president of the Royal Society of Brit. Artists. His pictures are widely distributed, and may be seen in the galleries of Birmingham, Chicago, Budapest, and Venice. As a painter of landscape, he evinced a rare gift for arranging his lines and masses as to produce, almost invariably, a charming and well-balanced composition. 'The White Carnival'

(Brussels), 'Autumn' (Manchester), and 'Passing Storm' (the Luxembourg), display this and other merits. He was knighted in 1910, and elected R.A. in 1913.

East Africa, British, see KENYA COLONY, NYASALAND PROTECTORATE, TANGANYIKA TERRITORY; UGANDA PROTECTORATE.

East Africa, German, see AFRICA, GERMAN EAST, CAMPAIGN IN FIRST WORLD WAR; RUANDA URUNDI; and TANGANYIKA TERRITORY.

East Africa, Portuguese, see PORTUGUESE EAST AFRICA.

East Albany, see GREENBUSH.

East Anglia, see ANGLIA, EAST.

Eastbourne, municipal and co. bor. and favourite seaside resort, 64 m. S.S.E. of London, Sussex, England. Formerly the site of the present tn. was occupied by the three hamlets of East-borne, South-borne, and Sea-Houses, the antiquity of which is attested by the mention of Borne in the Domesday Book. The interesting par. church of East-borne belongs to the transitional Norman period, and dates back to the twelfth century. The modern tn. with its miles of terraced promenades, its spacious tree-lined streets, pavilioned pier, theatres, Winter Garden, golf links, and handsome public structures, owes much to the seventh Duke of Devonshire whose family seat is at Compton Place, Eastbourne, and whose name is commemorated in Devonshire Park, a fine public pleasure-ground. The boundaries of the bor. were extended in 1911, 1927, and 1938, and in 1929 the Eastbourne Council completed the purchase of some 4,000 acres of Downland, extending from Beachy head to Folkington. The summit of Beachy Head is 575 ft. above sea-level and during the Second World War was the site of a radio location station. Civilian casualties through enemy air raids were: killed, 174; injured 932. 475 houses were destroyed and no fewer than 11,000 were damaged. This damage was caused by 747 high explosive bombs, 4000 incendiary and oil bombs, and 15 flying bombs. Pop. (estimated, 1940) 56,770.

East Cape (Asia), see DEZHNEV, CAPE.

East Chicago, city of Lake co., Indiana, U.S.A., on Lake Michigan, with a port importing coal, iron ore, and limestone, and exporting gasoline and steel products. There are important steel works, oil refineries, etc. Pop. 54,600.

East Cleveland, city of Cuyahoga co., Ohio, U.S.A., a suburb of Cleveland. Pop. 39,400.

East Conemaugh, bor. of Cambria co., Pennsylvania, U.S.A., 3 m. N.E. of Johnstown. Pop. 7000.

Easter, religious festival of great antiquity observed among Christians, in commemoration of the resurrection of Christ, occurring about the time of the vernal equinox. The Eng. name E. and the Ger. Ostern are said to be derived from the name of the feast of the Teutonic goddess Ostera, celebrated by the anct. Saxons early in the spring. When Christianity was introduced some definite way of fixing a date for E., upon which

many other festivals of the church depended, became necessary. There was much difference of opinion, and the E. churches commemorated our Lord's death on the fourteenth day of the moon after the spring equinox, and kept E. two days later; while the W. churches kept E. on the Sunday following the fourteenth day of the moon. The sect known as Quartodecimans commemorated only the death of Christ, on the same day as that of the Jewish Passover. The E. Church adhered to this, but the Church of Rome soon rejected it, saying that Christ's resurrection took place on the first day of the week after the Passover, and ought in that case to be kept on a certain Sunday. In A.D. 325 the Council of Nicea was held, and there it was settled that E. should be held on the first Sunday after the fourteenth day of the moon that occurred next after the vernal equinox, and that should the fourteenth day of the moon fall on the day of the equinox, the following Sunday was to be E. Sunday. Also it was decided that, in finding E., the vernal equinox should be considered to fall every year on March 21. It was later directed that this calculation should be made according to the tables of Victorius of Aquitaine, which he introduced in A.D. 457. As Britain was now no longer a part of the Rom. empire, this sixth-century order regulating E. had no effect at first on the Brit. church, which continued its calculation on the method originally approved of. But after more than a century of controversy the matter was ultimately settled at the synod which was held at Whitby, Yorkshire, in 664; and after this date the Brit. clergy conformed to the general practice of the W. church.

As at present ordained, E. falls on one of 35 days (March 22-April 25). On June 15, 1928, the House of Commons agreed to a motion for third reading of a Bill that Easter Day shall in the calendar year next but one after the commencement of the Act and in all subsequent years be the first Sunday after the second Saturday in April. E. would thus fall between April 9 and 15, both inclusive—i.e. on the second or third Sunday in April. A clause in the Bill provides that before it shall come into operation regard shall be had to any opinion expressed officially by the various Christian Churches. In consequence of lack of support, there is no present prospect of the adoption of a fixed E. Sir J. G. Frazer observed that 'at Rome the sacred fire in the temple of Vesta was kindled anew every year on the 1st of March, which used to be the beginning of the Roman year,' and from this old custom bonfires are still lit by the priest on E. Eve in many parts of Europe, especially Germany. The E. fire of Germany corresponds to the Beltane fire of Celtic Europe, which has the same ceremonies and beliefs, namely, that wherever the light of the fire reached, the fields would be fruitful and the inhabitants safe from sickness and danger. Games were also in use to celebrate E., such as dramatic performances, dances, songs, etc., and special cakes were made, of

which custom the present-day 'hot-cross buns' (bearing a representation of the cross), and 'simmel cakes' are relics. The custom of the giving of E. eggs, as symbols of resurrection, life, and fruitfulness, is an anct. custom and widespread, especially in Europe. See J. Tyrer, *Historical Survey of Holy Week*, 1932; Sir H. Grierson (ed.), *And the Third Day: a Record of Hope and Fulfilment*, 1918.

Easter Island, Rapanui, or (Sp.) Isla de Pasqua, lonely is., with an area of 46 sq. m., in the Pacific, situated in 27° 8' S. lat., and 109° 26' W. long. Since 1888 it has belonged to the Chileans, who use it as a convict station. It was so called because Admiral Roggeveen discovered it on Easter Day in 1722. In shape the island is triangular, and the three corners are each marked by volcanic heights. So far the Polynesian natives only take advantage of the fertile soil to grow potatoes, sugarcane, and bananas, but a Fr. house of Tahiti has introduced cattle-grazing. The spacious stone dwellings, the huge carved images of grey trachytic lava, and the broad platforms of massive, uncemented masonry, which are found on the is., are an enigma to archaeologists, who are at a loss to account for their presence on shores so remote from the known centres of early civilisation. Since the Peruvians deported the natives to work guano (1863), the number of these latter has dwindled to a hundred.

Easterlings, or Esterlings, see under **STERLING**.

Eastern Church, see **GREEK CHURCH**.

Eastern Empire, see **BYZANTINE EMPIRE**.

Eastern Front or Russo-German Campaign in the Second World War. (For Far Eastern Front, see **PACIFIC CAMPAIGNS**.) The Ger. invasion of Russia began on June 22, 1941. The goals in the main Ger. lines of advance were Leningrad, Moscow, and Kiev, after pressing the Russian armies back against the Berezina and the Pripet Marshes. This was Napoleon's plan, the main strategical possibilities of a campaign against Russia, owing to conditions of terrain, topography, and transport not being changed essentially even to-day. As in Napoleon's day, the strongest thrust was in the centre in the direction Vilna-Smolensk-Moscow. The invasion was made by three main armies, the N., and weakest, under von Leeb, the Central, and strongest, under Gen. von Bock, and the S. under von Rundstedt. Gen. von Leeb's primary task was to clear the Baltic states of Russian forces and bottle up the remaining Russian forces in the N. of Leningrad; and then, having taken Leningrad, he was to converge, with the Central Army, towards Moscow. These two armies were to move rapidly in the wake of the spear-head thrusts of the armoured panzer divs. under Guderian, Germany's leading tank general. But the S. army's position was very different. There Lwów (formerly Leinberg) and the very strong natural line of defence along the Grodek chain of lakes left only one chance of a frontal break-through, in the direction Vladimir-Volynski-Lutsk-Novogorod Volhynsk. The 'Stalin Line,'

with Kiev as a strong base behind it, stretched along the Dniester and through very easily defensible country in the direction of Zhitomir and Korosten; and to make a flank movement across the Pruth and then over the Dniester against the Stalin Line was impracticable owing to the weakness of the Ger. and Rumanian forces available for such a frontal attack, and even the minor Hungarian and Rumanian flanking attack through the Carpathian passes from the S. against Lwów was not at first successful owing to premature snowstorms (end of June). Everywhere, too, von Rundstedt's army was met by the élite of Russian troops. Swampy defiles along the S. edge of the Pripet Marshes involved complicated tactical manoeuvres by shifting tank forces behind von Rundstedt's lines. The main lines here of the Russian defences had been long previously laid down by Tukhachevsky but, as has been well said, his ghost and those of the hundreds of able Russian general staff officers who had been shot in the purge four years previously were now fighting on the side of the Gers. Rundstedt was compelled, after many difficult salhes, to wheel round to the S.E. right under the guns of Kiev and of the Stalin Line at Korosten, and to effect a daring operation in order to annihilate a large part of Budyonny's army W. of the Dnieper—operations for which there is no precedent. But in the tenth week of the campaign, von Rundstedt dominated the Dnieper and could co-operate strategically and tactically with von Bock's army.

The Central and N. armies followed much the lines of Napoleon's advance and that of the Gers. in the First World War—the first objective being the gap between the upper Dvina and upper Dnieper. This gave opportunities for breaks through parallel to the N. edge of the Pripet Marshes, from Grodno towards Baranovitch and Minsk, and from Vilna towards Minsk and Polotsk, this last being supported by von Leeb's right wing. In the First World War, however, the Gers., having inadequate forces, wasted their strength against the line of the Narva instead of attacking from Vilna. But in the Second war conditions favoured the invaders, whose new frontiers in Poland enabled them to attack from Vilna at once, while the fact that bridges over the Bug remained intact allowed Guderian to rush his panzer forces in a little over a fortnight through the Pripet Marshes and the Stalin Line towards Vyanza, 120 m. W. of Moscow, destroying or capturing a number of Russian armies on the way—one of the greatest battles in the hist. of warfare. The experience of the last war proved that the best line of Russian defence would have been along the lower Dvina towards Dvinsk, and thence due S. along the lakes and swamps around Lake Narocz through Minsk towards Hoberusk, or along the Stalin Line; for these lines could easily have been reinforced from the reserves assembled near Moscow just before the invasion was launched. It seems, however, that these reserves were thrown into the battle around Smolensk

after the encirclement of two large army groups east of Bialystok and near Minsk by Bock's panzer divs. and shared the fate of these two groups. Here there was a real chance in the first days of the campaign that breaks-through followed by encircling movements might involve the destruction of large Russian armies, but in the S. such chance would have existed only if von Rundstedt had had much stronger forces for a flanking movement across the Pruth and Dniester; while in the N. von Leeb had no such chance except, possibly, between Daugavpils (Dvinsk) and Lake Peipus after the Stalin Line had been pierced. Von Leeb, however, carried out a daring advance, capturing Kaunas and Daugavpils, breaking through the Stalin Line, repelling counter-attacks from Volki Luki, the Valdai Hills and Novgorod, and hemming in the remains of the Russian armies on the coast of Estonia and in Leningrad. The advance was fraught with risks, but von Leeb had the advantage, which the other Ger. armies lacked—the railways as far as the Dvina were of standard gauge so that supplies could be run to Riga and Dvinsk in the wake of the panzer advance thrusts. These tactical and strategical successes of the N. and Central armies were mainly due to the fact that the Russians elected to make their stand in the tatters recently acquired by the 1939 treaty with Hitler. Events showed that they ought to have adopted 'scorched earth' tactics from the beginning and destroyed all communications W. of the line Dvina-Lake Narocz-Minsk-Pripet, and then brought all their reserves into the Stalin Line, which they might have held indefinitely.

The Gers., pursuing their familiar blitz tactics, had hoped for much speedier triumphs in the opening two or three weeks' fighting. They had hoped that the impetus of the first drive would have given them Kiev and also carried them half way to Moscow from Minsk. But they made impressive advances, reaching the so-called 'Stalin Line,' which ran from the Gulf of Finland through Lake Peipus, along the frontiers of Latvia, Poland and Rumania to the Black Sea, with a depth at Minsk and other vital places of between 50 and 100 miles. But nowhere was this 'line' less than 20 miles deep, and the delaying tactics pursued by the Russians enabled them continually to strengthen their defences. By July 2, the Gers. had captured Riga, the Latvian cap., 300 miles from Leningrad, the port falling in a pincer movement from Jakobpils (Jakobstadt) on the Dvina, 70 m. to the S.E. and from Libau, 120 m. to the S.W. The Finnish threat to Murmansk and Karolia, which had early developed, was now becoming serious and strong reinforcements of the Soviet army and air force were rushed up from Leningrad to the N. front; while the threat to Leningrad through the Baltic States was checked by massing troops on the fortified lines running along the old Russian border W. and S.W. of the city against a threatened attack from Tallinn.

The Russian military leaders early reached the conclusion that it was impossible to hold up, indefinitely, massed forces of tanks with fortified lines, and they therefore began to work out the plans for an 'elastic defence,' the basic principle of this new strategy consisting of the separation of the Ger. panzer arm from its supporting infantry, coupled with harassing guerilla tactics. The defences of the road to Kiev had been planned personally years previously by Marshal Timoshenko, the Soviet commander-in-chief. But here, as in the threat to Leningrad, the position was critical after only ten days' fighting. All was dependent on the magnitude and quality of the Russian equipment. Technically the Russian war-machine of 1941 was very different from that of 1941. The modern Russian soldier and Army technician were almost entirely the product of the 'New Civilisation.' Yet Soviet industrialism, which secured imposing results in mechanisation and motorisation, did not wholly eliminate the human heritage of former days. Quality was always a weak link in the Soviet economy; but, since 1936, real progress was achieved through the energy of Ordzhonikidze, commissar for heavy industries; though the wastage of raw materials and the proportion of spoiled goods remained inordinate. Much remained to be done in general economic organisation. Under centralisation of economic direction excessive bureaucracy and inadequate planning were defects which left a deep imprint on Russia's economic life. In organisation and liaison Germany had the upper hand. Yet, the very precision of the Ger. war-machine hinged on its ability to keep to its time schedule. If this could be upset by the Russians the contending forces would, so far as technical performance was concerned, be more evenly matched. In the first days of July the Russians opposed a particularly stout resistance on the Berezina River (q.v.) to the N.E. of Minsk, repeatedly preventing the Gers. from crossing and, at the same time, taking a heavy toll of tanks. Fierce fighting developed towards Daugavpils, Borisov, Bobruisk and Tarnopol and the Russians were forced to withdraw in the Dvinsk area. Fantastic figures of Russian casualties were announced by the Ger. gov. to palliate their own losses. The Gers. claimed to have killed 500,000 Russians in the Bialystok area alone and that the total casualties were over one million; but the political necessity of producing apparently dramatic results for the rash offensive discounted these totals. The Russians, for their part, put the Ger. losses at 750,000 killed, wounded and captured. That the losses on both sides were very great is to be inferred from the fact that some 9,000,000 men were engaged on the vast battle-fields from the Arctic Ocean to the Black Sea; and that, at this rate of loss, both would soon have to call upon their reserves of man-power; but in this respect the advantage lay with Russia whose mobilisation was as yet far

from completed. Hence delaying actions were fought all along the front to give as much time as possible for mobilisation and the despatch of reinforcements.

The Germans approach the Stalin Line.—By this time the opposed 'line' ran through Riga—Daugavpils—Borisov—Volynsk—Tarnopol—Cernauti—Bielst. But along most of the front the position was very confused. For there was no 'line' in the orthodox sense as in 1914, but rather a defence of more or less unrestricted depth. The Russians were still fighting for the most part on soil annexed by them within the previous two years and the next stage of their resistance was based on the original defences begun on a large scale ten years previously along the former frontiers from Latvia to the Black Sea, and in July this 'line' had been pierced at only one point—from Minsk towards Smolensk. The determination of the Russians to resist the invader by all and any means was illustrated by the promptitude with which they carried out Stalin's 'scorched earth' order—the order to destroy everything in the wake of their retreat. The number of Ger. graves in Przemysl showed that the campaign, even at that early stage, was incomparably the bloodiest in the war. For battles over a front of such extent, involving such great numbers of men and elaborate equipment, there were no parallels. Ordinary standards of warfare were inapplicable, where the fighting assumed such novel patterns. The series of great counter-attacks by the Russians over the thousands of miles of front S. of Leningrad were evidence of this unorthodoxy. Gigantic battles were fought over vast stretches of country, and what convention might call the 'battle-front' was merely the main watershed of the resistance. Far behind, to the W., there were taking place other battles, sometimes by smaller bodies of men, living as they might and fighting with the fury of fanatics. Such deep battles involved problems for both sides. Soldiers might be starved, but tanks had to be fuelled or they became mere practice targets for any kind of artillery; for the supply cisterns, which some tanks carried, might extend the range but could not wholly meet the need, and the systematic destruction of all local supplies tended to immobilise them. By the end of the first sixteen days of the invasion, the Gers. had reached a depth of no less than 300 miles, giving an average of about 20 miles a day over the whole period—slightly faster than their advance on the W. Front to Sedan. Both sides were now preparing for a tremendous Ger. offensive against the Stalin Line, or chain of strong positions within the U.S.S.R. proper. So far the Gers. had captured practically the whole of the fringe of ter. annexed by the Soviet Union since 1939, except Estonia. Though progress had been made in the Baltic States, the vital sector in the campaign was in the neighbourhood of Minsk, where the Gers. were now making two distinct thrusts on either side of the railway, the N. through Lepel and the S. through

Bobruisk. Repeated Ger. attempts to cross the Dnieper were repelled and powerful counter-attacks were launched here and elsewhere by the Russians. W. of Kiev, in the Novgorod-Volynsk sector, the Gers. attacked with large tank forces. In the ensuing days, a savage battle raged round Ostrov, near the junction of the Latvian, Estonian and Soviet frontiers on the main Berlin-Warsaw-Leningrad railway. Hitherto the Ger. advance in the Baltic states had been comparatively leisurely, the roads being mainly intact and railways having the Ger. gauge as far as the Dvina, and the inhabitants welcoming and assisting the Gers. and so frustrating Russian ambush and guerrilla tactics. But over the border bridges were destroyed and the closer the threat to Leningrad, the stiffer became the defence. In White Russia the Russians destroyed a whole Ger. panzer div. between Polotsk and Borisov. In Bessarabia, heavy rain was bogging Ger. vehicles and the Russians had forced part of the invading forces back to the Pruth.

The end of the third week of what may be called compendiously the 'Battle of Russia' found the Gers. halted on a line running, roughly, from the Gulf of Riga across Latvia and White Russia to the River Berezina and then down, through the border regions of the Russian Ukraine, to the Upper Dniester, the Pruth and the Black Sea. There was now a pause in the struggle due to Ger. difficulties of supply and the exhaustion of the Ger. tank crews. At this time after three weeks' furious fighting the Gers. were still 140 m. from Leningrad, 400 m. from Moscow, 150 m. from Kiev and 130 m. from Odessa and at only two points were they in Russia proper—between the Ostrov and Minsk sectors and near Novograd-Volynsk, in the Ukraine. Against this, the Gers. had sustained great losses in men, tanks and planes, and, moreover, the Ger. High Command found itself unable to concentrate the entire strength of the Luftwaffe on the Russian front on account of the growing Brit. air raids in the W. of Europe, five of the best fighter squadrons being transferred to the W. in an attempt to check the R.A.F. When the Ger. attacks in force were resumed Pskov became the centre of the most desperate fighting, the Gers. making strenuous efforts to enhance their threat to Leningrad. In White Russia the Soviet forces retook Rogachev and Zhlobin, two important tns. The fighting spirit of the Russians remained unbroken. Everywhere the great mass of the people seemed to be fighting the 'national war for the Fatherland.' In Moscow a kind of Home Guard—the People's Guard—was raised, formed of civilians of both sexes, who had been taught sharpshooting and air defence in previous years. In all the tns. far to the W. of Moscow the able-bodied stayed on and barred their factories for resistance. Large groups of other civilians were evacuated to the Volga and the Urals. At the opening of the campaign errors were made which led to large bodies of men being cut through and en-

circled; but soon afterwards in defence and counter-attack the Russians showed not only coolness and great courage but marked ingenuity. Much had been learned from the mistakes of the Finnish War, particularly in the organisation of small units within the infantry to be trained for independent action, and in mobility generally. The continued guerrilla fighting in the border provs. of Russia showed that these steps had been put to effective use.

The second German drive.—In this drive in the titanic battles which began approximately on July 15, the Russians hurled some of their newest 150-ton tanks into the conflict which raged around Kiev's suburbs. Anti-tank and machine gun fire met the advancing Gers. from every alley and window. In the N. the Ger. thrust at Leningrad made some progress in Estonia, and Tallinn, the cap., by Stalin's order, was transformed into an inferno of fire and destruction so as to deprive the enemy of every kind of property, food and machinery. On July 16 the Russian Baltic fleet, headed by the *Kiroff* and the battleship *October Revolution*, with destroyers, bombarded Riga. Russian bombers also raided the port and barracks now occupied by Ger. troops. In White Russia, though Smolensk still held out, the fighting by July 18 had moved further E. as the result of the Ger. thrust between the Dvina and the Dnieper. The ensuing days saw more hard fighting to the N.W. of Smolensk, round Pskov, Porkhov, Polotsk and Nevel. 300 Russian tanks being engaged in the Bobruisk sector. Both sides again suffered heavy losses. But now (July 20) so menacing was the Ger. drive that a supreme effort in counter-attack was demanded, and Stalin, by assuming the post of Commissar of Defence, had put himself at the head of the people's armies. By a variety of tactics the Russians bewildered, delayed and wore down the Ger. columns. Ger. panzer units were allowed to pass as if they had carried all before them. Russian armoured units would then suddenly emerge from concealment and make an unexpected onslaught on the slower Ger. infantry, which was thus exposed to the full blast of the Soviet tanks. Often at dusk, Russian motorised units joined in behind a Ger. column, following it up until there was a suitable moment when the Gers. were advancing into an ambush and these tactics were especially successful after the capture of Novograd-Volynsk by the Gers. The Gers. now found that they were unable to convince the world that they were on the point of capturing Leningrad, Moscow and Kiev, particularly as the Russians showed a faculty for adapting themselves to any change of tactics which the Gers. attempted. In consequence, the Ger. High Command now declared that the only real military advantage they could achieve consisted of encircling and destroying the Russian forces and that further territorial gains were of dubious worth because of their cost.

The next centres of severe fighting were

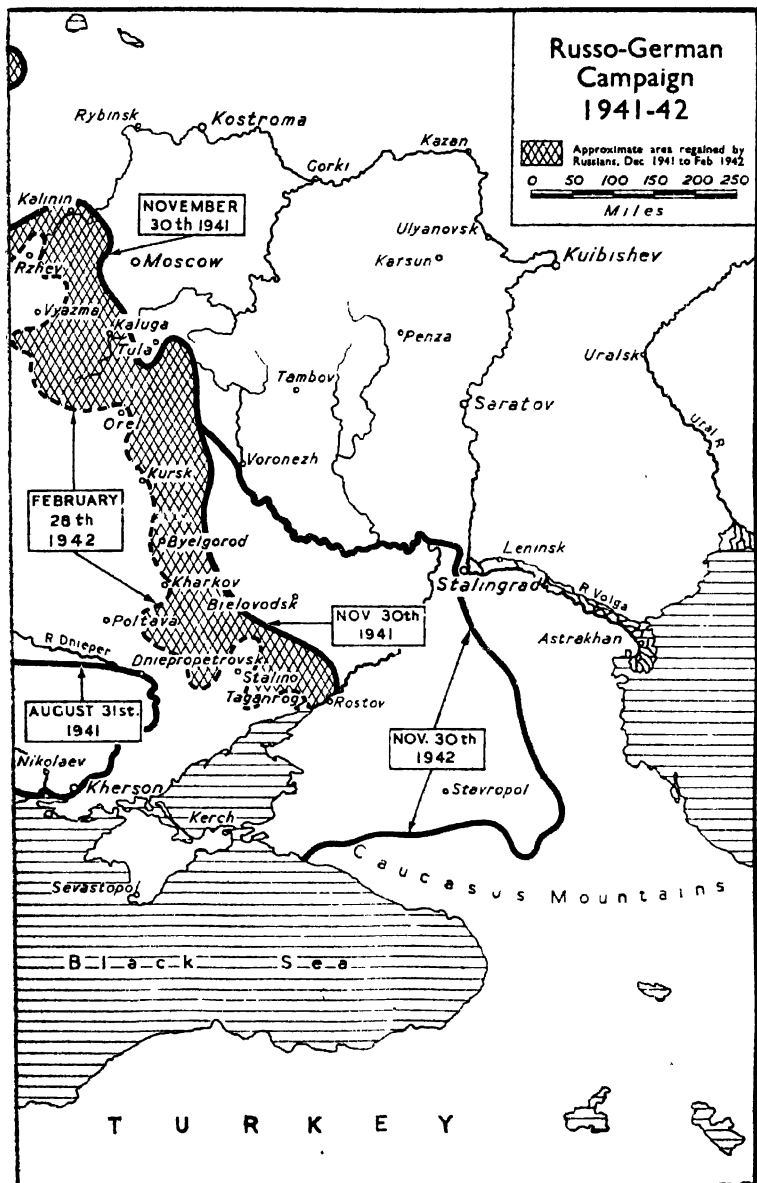
E.E. 5

in the sectors of Petrozavodsk, on the Murmansk railway, N.E. of Lake Ladoga, and of Zhitomir, in the Ukraine, E. of Novograd-Volynsk, on the road to Kiev. There was also a renewal of the intensive Ger. drive towards Leningrad, in which the Russians continued to offer a stubborn resistance at Porkhov, and in the drive towards Moscow, where the Russians still held out stoutly in the Smolensk sector. On July 21 Moscow had its first of a series of Ger. air-raids, but very few Ger. bombers were able to penetrate the city's defences. The Gers. lost 22 out of over 200 planes and it was evident that the Russians had benefited from Britain's experience of raids, the interchange of information leading to the timely adoption of fire-watching and A.R.P. organisation. The Ger. intention was much simpler than its result. It was to strike in two thrusts towards Moscow, one N. of the Smolensk-Moscow road through the gap between the Dvina and Dnieper rivs. and S. of the road eastwards from Bobruisk. When they had got so far the two columns would meet, compressing and annihilating the Russian forces between them. The Gers. knew that in the critical battle for Smolensk everything depended on whether reinforcements would arrive in time. It was the part of the Russian defenders, boldly staying in their positions after they had been penetrated by the tanks, to see that reinforcements did not arrive. Again at the N. end of the front the invaders were making but little headway, and the main defending forces near Murmansk had not yet been engaged; while the heavy fighting N. of Lake Ladoga was chiefly responsible for the great numbers of wounded then spreading over Finland in the last two weeks of June and intensifying the gloom in that unhappy country, where the atmosphere was strikingly different from that of the last war. The destruction, too, of war material on both sides was immense, and the losses were cancelling each other out. Thus the great battle or series of battles on the Russo-Ger. front bade fair to produce a degree of exhaustion and wastage comparable to that on the W. Front in 1918. The Gers. sought strenuously to convince the world that they had torn a gap in the Russian line as wide as that at Sedan, but the conditions on the Russian front, as shown above, were quite dissimilar. There was, moreover, no trace of that political disaffection upon which the Gers. had counted, nor any sign of disintegration in the Red Army. Furthermore, as has been seen, the Russians were only now completing their mobilisation and could always bring up new units to meet Germany's battered hordes. Yet the problem for Russia seemed to be whether the political and industrial risk involved in an ordered retreat towards the Urals would counterbalance the risk of losing the Red Army in the pitched battle which the Gers. were now seeking to force on it.

A War of attrition.—Apart from the growing threat to Odessa, the fighting began now, as in the previous World War,

D





to take on every day more of the character of a war of attrition. Since the advances beyond Minsk and Bialystok, the large scale Ger. encircling movements had not yet resulted in a single decisive thrust. Every indication now seemed to point to the launching of their third offensive, which promised to exceed in ferocity its predecessors, inasmuch as failure to break through anywhere might bring the whole campaign to the verge of desperation. There was now (Aug.) a comparative lull in operations against Leningrad like that on the more S. front, the pause being due to the Gers. concentrating on the improvement of their communications. Towards the end of the first week of Aug. the fighting was mainly around Lake Ladoga near Kexholm, and in the Ukraine where Marshal Budyonny still held the invaders. The check at Smolensk, however, required explaining away, and to restore confidence in Germany, the Ger. High Command actually claimed that, since the opening of the Ger. invasion in June, the Russians had lost 895,000 prisoners, over 13,000 tanks and 9,000 aircraft. The Russian Command, while not disclosing their own losses, estimated the Ger. casualties during the six weeks of fighting at 1,500,000 and attributed the exaggerated Ger. claims to the necessity of bolstering up the moral of the Ger. people and lowered fighting spirit of the Ger. troops. A serious threat to the Soviet defences was now, however, developing in the S. Ukraine in the vicinity of Uman, Byelaya Tserkov, and Korosten. In this region the forces of Gen. von Rundstedt were making strenuous efforts to destroy those of Marshal Budyonny, who was stubbornly contesting the thrust against Odessa and, meanwhile giving the Ukrainians time to gather the harvest. He skillfully extricated his forces from Rundstedt's trap and re-consolidated his front along the E. bank of the R. Bug. Fighting was still severe in Estonia, Finland, and around Smolensk, but the Ger. main effort was concentrated in the Ukraine, because success there might well give them the industrial area of the Donetz basin and, ultimately, the Caucasus. On Aug. 13, the Russians evacuated Smolensk. But this did not mean the end of the great battle of Smolensk and very desperate fighting continued round the city, the encircled Russians W. of Smolensk, far from being put out of action, constituting a serious encumbrance to the Ger. advance and harassing and hindering the supply of munitions and food to the enemy. With Aug. half gone, the Ger. armies still had no spectacular prize for the Ger. people. Leningrad, Moscow, Kiev, and Odessa still remained in Russian hands. The position in the centre, where the armies of von Bock faced those of Marshal Timoshenko, was static and the Russian commander was steadily foiling all attempts by von Bock's troops to break through on Budyonny's right flank. But in the S. the position of the Russians was critical and Marshal Budyonny's retreat involved a drastic change in tactics.

Yielding to ever-increasing pressure from the forces of Gen. von Rundstedt, Budyonny had given up the valuable Krivoe Klog industrial area, and was exerting all his efforts to withdraw his armies to the E. bank of the Dnieper so as to protect Odessa and as much of the E. Ukraine as might be practicable.

Novgorod evacuated—Battle for Leningrad—After stubborn resistance the Soviet forces evacuated Kingisepp (formerly Zhamburg) the first station inside Russia on the main Tallinn-Leningrad railway and 90 m. by road S.W. of Leningrad yielding in face of a Ger. attack N. of Lake Pelpus and from the direction of Narva. In the centre the immediate Ger. objective was Gomel, an important railway junction halfway between Smolensk and Kiev, which was deemed almost impregnable and which the Gers. had seemed on the point of taking a month previously. And always, while the W. nations hoped that their Russian allies might be able to produce a position of stalemate, as often were they disillusioned by the blazing up of attacks along the whole front from the White Sea to the Black Sea. Stubbornly as the Soviet troops fought for their land, the Ger. advance continued, slowly but remorselessly, involving ever more sacrifices by the Russians in conformity with the 'scorched earth' policy of Stalin. But the nearer the Gers. approached the great city the more obvious it became that the inhabs. intended to defend it to the death, and that over a million inhabs. proposed to carry weapons and to use them, while the outer defences of the city were formidable to a degree. By Aug. 21 the Russians had to evacuate Gomel and had lost a large number of prisoners and guns in its defence. There was something in the nature of a pitched battle for this, and the Gers. paid a high price for it. The tremendous pressure of the Ger. thrust on Leningrad met strong resistance from Marshal Voroshilov's army. The month of Aug. was ending and the 50-mile deep defences of the city showed no sign of collapse or of weakening. The Russo-German campaign was now over two months old and in that period the Gers. lost between 1,500,000 and 2,000,000 in killed and wounded, more than 8,000 tanks, 10,000 guns and some 7,200 aeroplanes. The total Russian losses were also very high but were probably much less in men and rather less in material.

The fact that, at this date, President Roosevelt and Mr. Churchill had chosen Moscow as the place where proposals for aid to Russia would be discussed was not without significance at this crucial juncture of the life-and-death struggle between Russia and Germany, since their decision implied that two of the best-informed statesmen in the world were confident that Moscow could withstand all dangers for a long time. Nevertheless, the Gers. continued to advance regardless of losses. Novgorod, S. of Leningrad, was evacuated by the Russians on Aug. 25 after tenacious fighting. In the S., Marshal Budyonny's forces were retiring towards

the crossings of the Dnieper and the important town of Dniepropetrovsk (formerly Ekaterinoslav) famous for its colossal dam, a peak of Soviet achievement, was now threatened. The following day Luga, 90 m. S. of Leningrad, fell to the Gers. and the outskirts of Dniepropetrovsk were also abandoned by the Russians. The citizens of both sexes of Leningrad were now flocking in their thousands to join the Home Guard. Day by day fierce fighting continued along the entire front, but with especial severity towards Leningrad, Gomel, and Odessa. The Russians, however, destroyed the dam over the Dnieper and so had paralysed the vast industrial undertakings of the E. Ukraine—a salutary warning to the Gers. of the determined Russian temper. Dniepropetrovsk itself was now abandoned. The destruction of the dam at Dniepropetrovsk was turning a substantial section of the Dnieper back to its original rapids and swamps. As Budyonny had withdrawn most of his troops across the Dnieper the riv. was likely to prove a serious barrier to the invader. A brilliant counter-attack by Gen. Konev in the Gomel region just E. of the Pripiet marshes certainly saved Budyonny's forces from being outflanked by Gers. crossing the Dnieper.

The battle for Leningrad was now reaching an acute stage, the fighting being particularly fierce round the vital railway junction of Veliki Luki, 120 m. N. of Smolensk, which now fell into Ger. hands. Ger. 'Stuka' dive bombers were launching numerous attacks on Leningrad's outer defences and had been doing so for many days, yet without dominating the air, and the casualties inflicted by the Russian anti-aircraft guns and fighter-planes ran into hundreds of bombers and fighters (Aug. 20–Sept. 3), being heavier than the Russian air losses. The operations against Leningrad both in scale and intensity overshadowed those elsewhere on the front (Sept. 1–4), for the Gers., true to their estab. tactics, were concentrating all their available forces to achieve the object which at this moment was most important to them. But Marshal Voroshilov, now personally in command and assisted by a war council of six, not only continued to hold the Gers. at bay but threw back his enemy sev. miles in the centre of his advance.

Russian victory at Yelnya.—In the Smolensk area, Timoshenko's counter-attacks made the Gers. reconstitute the central sector, in which their advance from Gomel to the rear of Kiev was retarded. On Sept. 4 the Ger. forces halted 50 m. from Leningrad and bitter fighting raged along a line which had now become more or less stabilised. Marshal Voroshilov held an advantage in the possession of supply bases close to the rear, as Leningrad's military industry was extensive and highly developed, whereas the Gers. were able to obtain scarcely any supplies locally and only at all from far-distant Germany. The Russian defensive forces on the outer periphery of the Leningrad sector were making full use of the marshy

terrain and mining all roads wherever they had to withdraw. Casualties on both sides continued to mount up. The fighting in the centre of the front showed no sign of abating (Sept. 7). In the S., Budyonny's guerillas, especially the Cossack groups, were very active and were creating great difficulties behind the lines of von Runstedt's army and thereby delaying that general's assault on Odessa and the Crimea. After some 26 days of fighting the Russians succeeded in re-taking the tn. of Yelnya, 45 m. E.S.E. of Smolensk, eight Ger. divs. being routed, their remnants retreating westwards (Sept. 8). But the battle for Leningrad continued with unabated fury and the Gers. captured the important tn. of Slisselburg, E. of the city near Lake Ladoga. Timoshenko's army, continuing to counter-attack in the Yelnya sector, had now driven back the Gers. 15 m. beyond that tn. and was still advancing. This victory at Yelnya was the first major success against the Gers. that the Russians were able to claim. It was the more momentous in view of the approach of winter and seemed in the eyes of Russia's allies almost to justify the hope of an eleventh-hour turning of the tide of war on the E. front. At least, however, it virtually assured the safety of Moscow for the rest of the year while a successful Ger. drive across the Dnieper was rendered improbable. The urgency, in view of the impaired Ger. morale at home, of the Nazi need to capture Leningrad was revealed by an order of the day issued by Marshal von Leeb, declaring that the city must be taken within the next few days regardless of cost. This order (Sept. 10) was a direct consequence of the serious threat to both Ger. flanks which had developed owing to the successful convergent threats of Marshals Timoshenko and Budyonny towards Gomel. These compelled the Gers. to make a supreme effort at both ends of the front, at Leningrad and Odessa, with the aim of reaching these objectives without further loss of time. It was, further, essential that troops and equipment should be set free in order that the entire strength of the Ger. military machine might be hurled into the central sector, towards Moscow: this was necessary, not only because the colder weather heralded winter's approach, but also because, if Timoshenko and Budyonny were able to concentrate enough men and equipment, they would stand a good chance of inflicting such a serious major defeat that the Gers. could not recover from it, at least during 1941; while the effect on the spirit of the Ger. home front might well be disastrous. This explained why the Ger. air raids on Leningrad were the fiercest of the whole war and why, regardless of the sacrifice of life, Ger. ground troops were driven relentlessly into the deadly fire of the Russian fortresses, although Marshal Voroshilov's barrage still prevented the invader from making any substantial advance.

Russians evacuate Kiev.—Kiev was now in danger from a double thrust—to the N. across the riv. and a drive by von Bock

S.E. from Gemel. An obvious purpose of this thrust was to occupy the Donetz basin, one of the main industrial systems of Russia, and the Crimea, against which an amphibious attack was being developed. Soon the Ger. drive through Kherson bade fair to cut off the Crimea from the mainland. By Sept. 20 the situation of Kiev had become hopeless, but the battle for the city, which had now lasted 45 days, cost the Gers. 70,000 men. On Sept. 21 the Russians evacuated Kiev, but a fierce and confused battle continued to the E. of the city, both sides suffering great losses. When the enemy entered Kiev they found the city devastated, all the most valuable industrial equipment having been taken away. At the southernmost extremity of the front von Runstedt's drive to the Sea of Azov had completely isolated the Crimea by land, but behind the very powerful fortifications of the peninsula the Russians still offered a very stubborn resistance.

Meanwhile the battle for Leningrad continued with undiminished ferocity on land, on sea and in the air; but so tenacious was the defence of the army of Marshal Voroshilov that, even by the end of the month, no substantial change had occurred in the situation. Again and again the Gers. resumed the assault on the outer defences with waves of dive bombers and with infantry armed with flame-throwers; and so incensed were they at being repulsed that they warned the defenders that if they did not surrender the city it would be burnt to ashes. The battle had drawn somewhat nearer the city by Sept. 26, but not actually in the suburbs, the defence being of considerable strength and depth. R.A.F. fighters had now reached the city and were providing escorts for Russian bombers.

Germans drive on Moscow—*Soviet Government moved to Kuibishev*.—The ensuing month saw most bitter fighting along the whole front. This fighting soon became concentrated in tremendous drives towards and around Moscow and against the Crimea—Leningrad being, for the most part, left free from major thrusts because the Gers. hoped that they might, by cutting the rail communications, starve out that city. The drive on Moscow took the familiar form of two converging thrusts—one from the S.W. and the other from the N.W. Simultaneously the Gers. launched a powerful drive in the Ukraine towards Kharkov and attacked the Crimean roads and railways from the air. These great attacks were prepared and launched before Hitler, in order to revive the waning enthusiasm of the Ger. people, had announced on Oct. 3 in Berlin that the Ger. armies were on the point of delivering new offensives. The Russian people, however, were not long to be left in doubt that they were shortly to experience heavy trials; but their spirit of resistance showed no sign of weakening in spite of the early successes of the Ger. onslaughts. These were especially furious in the region of Briansk and Vyasma, S.W., and around Orel due S., of Moscow. Orel was evacuated on

Oct. 8, Briansk four days later, and Vyasma on the 13th. The Ger. pincers were remorselessly closing in a ring round Moscow. It was evident that the Ger. High Command was prepared to throw in fresh forces as often as the situation demanded it. By mid-Oct. the Russians, strengthened by reserves from Siberia, had checked the enemy in the S. and central areas of the Moscow sector; but a formidable threat was developing in the vicinity of Kalinin, N.W. of the cap. and, as ever more masses of Gers. were flung into the attack, the peril to Moscow and also to the Crimea deepened. The Soviet gov. now moved from Moscow to Kuibishev, though Stalin himself remained in the cap. This move, however, was precautionary and did not indicate that the Russians believed the fall of Moscow to be imminent. The danger, indeed, in the Crimea was the greater; for Odessa was evacuated by Oct. 16 after furious street fighting between the Gers. and rear-guard defending Russian forces covering the garrison while it was being evacuated by sea to other sectors. It now seemed clear that the Gers. could not take Moscow by their present surge forwards, which by mid-Oct. had not yet brought even their armoured shock units within 50 m. of the Kremlin at any point. By Oct. 18 their efforts to encircle the city had brought their forces in a ring marked by Kalinin, Rzhev, Mozhaisk, Kaluga and Tula. By the thrust through Kaluga they hoped to take the important industrial tns. of Serpukhov and Kolomna, the capture of which would not only deprive the Russians of valuable munitions, but would also cut the two main railways radiating S. and S.E. from Moscow, and practically encircle the city. But the pace of the Ger. advance towards their goal had now become slower and the Russians were making strong counter-attacks, notably at Kalinin, which often changed hands, Mozhaisk, Maloyaroslavets and near Orel. On Oct. 19 Stalin signed an Order of the Day, as chairman of the defence committee, that 'Moscow would be defended to the last,' while a state of siege was declared in the capital.

After a lull of some days, the Gers. resumed the offensive in the S., mixed Axis forces of Rumanians, Its., Hungarians and other mercenaries advancing towards Taganrog and the industrial centres of the Donetz basin. The main advance was chiefly along the coast towards Rostov and the Don. Heavy attacks had been delivered for weeks on the Perekop Isthmus, but the Russians held this gate to the Crimea with amazing tenacity. At about this time the Russian armies were re-grouped into a N. group under Marshal Zhukov, former chief of the general staff, who included Moscow in his command, and a S. group under Timoshenko.

Over 100 Ger. divs. were now operating between the Orel and Kalinin regions and half of these, including 4,000 tanks, were in the central sector trying to smash a path to Moscow through Mozhaisk and Maloyaroslavets. Their losses in the first fortnight of Oct. in this one sector

were about 200,000 killed and a similar number seriously wounded or missing. Towards the end of Oct. the Russians were compelled to evacuate Stalino, an important armament centre in the Donetz basin, but only after a battle in which the Gers. lost 50,000 men in killed and wounded. Other important tns. lost were Kharkov and the railway junction of Belgorod. When the Russians had failed to hold the line of the lower Dnieper, the Donetz industrial regions appeared to be doomed as soon as the Gers., with their mercenaries, should be in a position to undertake a determined drive: for Marshal Budyonny had no really favourable natural line of defence before the Don. The Russian difficulty in the S. was that Marshal Timoshenko only assumed command of this front when it was wavering under a succession of heavy blows, and his first task was to re-form, reorganise, and regroup his armies and to do so under the pressure of the enemy.

The loss at this date of some of the industrial centres of the Donetz Basin, such as Stalino, was serious and, of necessity, demanded a correspondingly greater effort by Britain and America to make good Russia's supply of war material; and even if Germany could not easily secure the Russian material of which she stood in sore need, she might be able to cut the link connecting Russia to her overseas supply bases.

The position in early Nov., following the setting in of snowy conditions alternating with heavy rain, so that tanks and motorised columns were bogged, was that the Russians had been compelled to make a considerable withdrawal in the Crimea, while holding the attackers on the Moscow front. But at least they denied the Gers. much advantage from their conquests. The advancing enemy hordes, instead of finding cities of plenty, with warm accommodation for their troops during the winter campaign, came always upon a scene of utter desolation. Everywhere in the wake of the Russian retreat was evidence of the efficiency with which the workers and plant had been evacuated and destruction wrought on what was left of industrial buildings and equipment. Russian resistance, strengthened by reinforcements, was now so successful that in the centre and N.W. the Gers. were fought to a standstill and, in places, even compelled to fall back. On Nov. 3, however, the Gers. began their fifth attack on Moscow, using strong tank forces and large numbers of dive-bombers. But they were soon forced to abandon their characteristic tactics of going all out for a breach with a large armoured forces backed by motorised infantry and to launch attacks in the old manner, with a small tank detachment followed closely by infantry advancing on foot. The inference was that they did not hope to break through and that their armoured divs. were below strength. Their main blows were at Kalinin and Tula; but they made no headway and attributed their failure to weather conditions. In the S. von Runstedt captured Feodosia, a Black

Sea port near Kerch Strait, and broke through the ill-fortified Perekop Isthmus by throwing in overwhelming forces, regardless of casualties. On Nov. 6, Stalin, on the occasion of the twenty-fourth anniversary of the October Revolution, declared to the Soviet that Ger. plans for overrunning Russia had miscarried and that the strength of their enemy was beginning to fail, while the power of the Soviet Union was still growing. He stated that Russian losses since the opening of the invasion were 350,000 killed, 378,000 wounded and 1,020,000 missing; during the same period the Gers. had lost in killed, wounded, and prisoners over 4,500,000 men.

For a brief space winter brought to a standstill all major operations except those in the Crimea, where, in the course of Nov. the Gers. overran most of the peninsula, taking the cap., Simferopol, and the naval base of Kerch, and threatening Sevastopol. The lack of adequate winter quarters, which the hoped-for capture of Leningrad, Moscow and Rostov was intended to provide, was leading to discontent and resentment among the Ger. troops and necessitated profound military redispersions. But, although the weather and the lengthening Ger. supply lines reduced mobility, heavy fighting broke out on various parts of the front and the Gers. gained one important success in the capture of the junction of Tikhvin, S. of Lake Ladoga and due E. of Leningrad. But the Russian position with regard to reserves was improving as the result of the organisation by Marshals Budyonny and Voroshilov of new armies composed of partly-trained men. In Rostov there was bitter street fighting, while, in the Donetz basin, the Russians recaptured some heights and even advanced some 30 m. or more. It might well seem remarkable that the Ger. armies could continue for months to sustain an offensive on so vast a scale with lines of supply extending for hundreds of miles in a hostile land where, as the year wore on, weather conditions grew ever worse. Often in these later months Ger. tanks and lorries were halted axle-deep in mud and snow. Yet always their armies advanced undeterred by the task of disposing not only of their own great numbers of wounded and dead but of the not less numerous Russian prisoners.

Russian counter-offensive.—The Ger. plan, in their second general offensive against Moscow, which had begun in mid-Nov., was to break through the Russian lines and encircle the city with a wide out-flanking movement by almost all their armoured and mobile strength, combined with pressure on the front or centre, this latter attack being mainly carried out by infantry formations of the normal type. In order to achieve this, the Gers. must capture Tula, and other places to the S., and Klin, Rogachev and other places to the N. and, finally, strike at Moscow from three directions and occupy the city. Up to Dec. 6, the Russian forces waged fierce defensive battles against very large Ger.

tank groups and divs. of motorised infantry (11 panzer divs., 4 motorised divs., and 4 infantry divs.), holding back the offensive of the shock flank groupings of the Gers. and repelling their auxiliary thrusts in the centre (12 infantry and 2 panzer divs.) especially in the direction of Narafominsk, Zvenigorod, and Istra. The desperate Ger. onslaught had, by Nov. 26-27, made some progress W. and N.W. of the city, while also maintaining formidable pressure against Gen. Belov in the Tula area. But these relatively small gains had been won only at the price of very heavy losses, the Ger. dead (from Nov. 16 to Dec. 6) numbering 55,000. On Dec. 6 Gen. Zhukov launched a counter-offensive against the Ger. forces on both flanks. Both Ger. formations were routed in five days' fighting and re-treated rapidly, losing an additional 30,000 dead. In these three weeks the Russians captured and destroyed (without taking into consideration Air Force operations) 1434 tanks, 3416 lorries, 675 guns, and hundreds of machine guns and other material. Equally dramatic was the change on the S. front where, early on Nov. 29, the Soviet Fifty-seventh Army of Gen. Remizov attacked across the Don S.W. of Rostov and launched an assault which crumpled the Ger. defences and carried the Russians back into the city itself. The following night the Soviet Ninth Army under Gen. Kharitonov, crossing the Don near Novochoerkassk, broke through the Ger. lines and entered Rostov from the N.W. thereby almost encircling the Gers. After savage street fighting for two days, in which the Gers. lost over 5,000 dead and great quantities of guns and munitions, the remnants of their forces under Gen. von Kleist re-treated in disorder towards Taganrog pursued by the Russians and harried by guerillas. Two Ger. tank divs., one motorised div. and the S.S. Viking div. had ceased to exist; while another, the S.S. Adolf Hitler (tank) div., and three other infantry divs., and suffered crushing losses. This was Germany's first serious defeat on the E. front, and was a remarkable vindication of Stalin's judgment in placing Marshal Timoshenko in direct command on the S. front. The Ger. explanation of their 'evacuation' of the city was at once a signal proof of their defeat and a commentary on their military mentality. For the Ger. High Command made the astonishing statement that their armies fell back in order to carry out 'ruthless reprisals' against the civilian population in their rear.

This major Russian victory helped the army of Gen. Belov in co-operation with the forces of Gen. Konev, to make further progress in the all-important Tula section at a moment (Dec. 2-3) when Ger. tank thrusts round Mozhaisk were forcing the Russians to retire to new positions. But some few days later the Ger. armies, beaten to a standstill on the whole E. Front by intense cold and deep snow and, above all, by the almost miraculous tenacity and courage of the Russian soldiers, halted their Russian campaign for the

winter. Brit. and Amer. aid in tanks, guns, planes, and other equipment contributed to this result; as also indeed did the constant bombing of objectives in Germany and the occupied countries of W. Europe by Brit. airmen, and Gen. Auchinleck's offensive in Libya; for these assaults involved the transfer to W. Europe and N. Africa of increasing numbers of Ger. fighter planes and pilots from the E. Front. The Ger. official announcement of their intention to abstain from any major strategic moves during the winter was a momentous one, for their abstention was forced upon them by the miserable condition of the majority of the Ger. soldiers, who were quailing before the first Russian frosts. The effect of the Ger. admission coupled with the supersession of Marshal von Bock on the Russian armies was electrical, and it became evident that, in spite of the rigours of winter, they would certainly not allow the Gers. leisure to dig in anywhere near the front as it now stood. The recapture of the important tn. of Tikhvin by Gen. Meretzkov, formerly commander of the Leningrad military dist., and of Elets, E. of the Orel-Kursk line, were symptomatic of the general tendency exemplified in Gen. Konev's relief of Tula. From this time the Russian generals took the initiative and throughout the bitterly cold winter months steadily pressed the invaders back. The Ger. front as at Dec. 6, the farthest point of their advance, ran approximately through Shlisselburg-Novgorod - Kallnin - Rogachev - Moskva - Narafominsk - Serpukhov - Tula - Stalinogorsk - Elets - Byelgorod - Kupiansk - Rostov-Kerch. By the end of Feb. much ter. had been recovered, the Ger. line being forced back to Kholm, Veliki Luki, Rzhev, Yelnya, Orel, Kursk, Kharkov, Lozovoe and to within a few miles of Mariupol, hundreds of tns. and vils. being liberated in the advance. Kallnin, an important tn. on the Moscow-Leningrad railway about 100 m. N.W. of the cap., fell on Dec. 15. This success, coupled with the Ger. defeat at Tula, compelled the Ger. forces, which had attacked the approaches of Moscow frontally, to make a hurried withdrawal, leaving in Russian hands great quantities of material and many prisoners. Moreover, the Gers. now began to find difficulty in transferring troops to hard-pressed points without the risk of dangerously weakening other points, since the Russians were attacking all along the front and there was always a danger of Ger. reinforcements being stranded and frozen on the journey. On Dec. 29-30 Russian troops under Gen. Kozlov on the Caucasian front, in collaboration with naval forces, made a landing in the Crimea and occupied the tn. and fortress of Kerch and Feodosia. Russian cavalry were now in action in the Ukraine against Ger. infantry, not only by day but also during moonlit nights. So ill-clad were many Ger. troops for the winter campaign, that the Ger. gov. organised a house-to-house collection throughout Germany and occupied countries of warm clothing of all kinds, in-

cluding also privately-owned skis. This collection operated especially harshly on the luckless inhabs. of Czechoslovakia and Poland, who had already endured untold hardships. However, few of the comforts reached the Ger. troops in time.

The New Year opened well for Russian ascendancy, the tn. of Kaluga, 110 m. S.W. of Moscow, being recaptured, while no fewer than 16 Ger. divs. under the Ger. panzer leader, Gen. Guderian, were routed. A Black Guard Brigade, which was flown from Poland in troop-carrying planes, failed to stem the retreat. As a fact Kaluga had changed hands many times in furious fighting. Its final capture by the Russians marked the definitive liberation of the tns. of Naravominsk, Lugorski, Zavod, Alexin, Tarusa, Odoyev, Likhvin, Kozelsk and hundreds of vils. and settlements. The Russians were now pursuing the Gers. from Kerch, where again large quantities of equipment were abandoned. On the central Moscow front their advance was threatening Rzhnev, Vyazma and Yukhnov, the Gers. extricating thither what they could of their forces around Maloyaroslavets—one of the celebrated battlefields of Napoleon's campaign—and from the important position of Mozhaisk, which latter position still remained in the tenacious Ger. grip. Maloyaroslavets, 80 m. S.W. of Moscow, fell on Jan. 9 a. r. l., three days later, the Russians retook Borovsk and were closing in on Mozhaisk. This latter tn. fell on Jan. 19, three Ger. divs. holding on till the end, the whole scene of battle being weirdly illuminated at night by two blazing vils. in the near vicinity. Every house in Mozhaisk had been turned into a fortress. There were huge stocks of ammunition in the tn. which the Gers. were unable to move. Strictly, the fighting in this region was a large-scale rear-guard action, most of the Ger. troops originally garrisoned there having been withdrawn to avoid encirclement. In the Crimea the Gers. retook Feodosia, though Russian pressure was maintained E. and W. of Taganrog. In the centre, following a break through in the Valdai Hills between Smolensk and Lake Ilmen, more places were recaptured, including Kholm and Andreapol, the advance bringing the Russians to within 100 m. of the Latvian border and threatening Veliki Luki, the railway junction and base for von Leeb's forces investing Leningrad. Considerable progress was also made in the Ukraine by the armies of Timoshenko, who had begun a new general offensive on Jan. 18, much booty being taken after the capture of the hotly-contested position of Lozovoe (Jan. 29). A few days later the famous Russian marshal was striking towards Dnepropetrovsk, Myelgorod and Kharkov. At the same time especially fierce Russian assaults were being delivered on the Leningrad front towards the vital position of Shlisselburg (15–20 m. E. of Leningrad), where Gen. Morozkov's forces were attacking across the ice and along the shores of Lake Ladoga in an attempt to trap von Leeb's positions in this area which the Gers. had heavily

defended with fortified lines and deep mine-fields. But the deliverance of Leningrad was not yet at hand, for other positions lay athwart the Russian path, notably in the Staraya Russa area, S. of Lake Ilmen, where the next great battle was begun at the end of Feb. Surprise moves by the Russians, involving the cutting of two roads through deep snow-fields and a night march of 27 miles by troops specially protected against the intense cold, outwitted the Gers., who had made the tn. of Staraya Russa a munitions base and starting-point for their Moscow offensive, and effectually destroyed every hope of relief from outside the huge encircling ring of the Red Army.

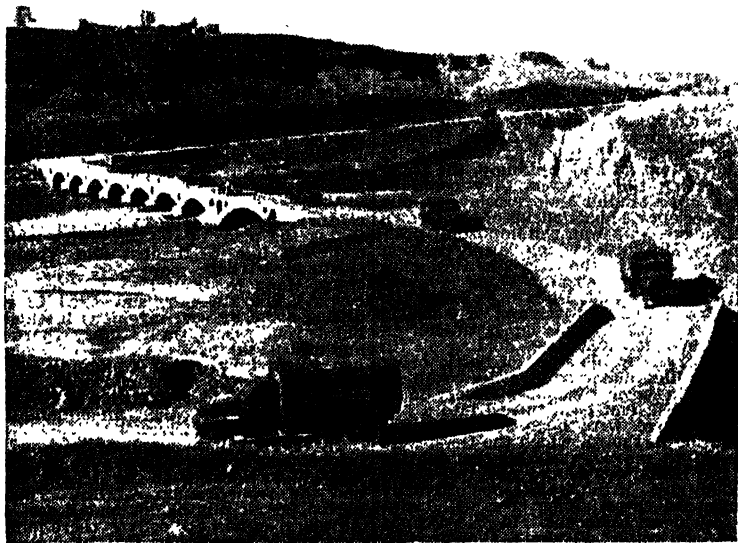
Spring was now at hand and the fate of continents hung upon the titanic struggle. The Gers. were striving to maintain a series of large-scale centres of resistance or buttresses, behind which they might keep communications open and, for a time, provision by air-borne supplies. The Russians for their part, were penetrating between these strong places, which, in fact, represented a modern or informal version of the ring-defences of the last century, heavily-fortified vils. or small tns. taking the place of the forts with which engineers like Brialmont and Vauban surrounded their main fortresses. To storm these by frontal assault was too costly. The Russians succeeded in reducing some by sev. ingenious methods, but as yet Vyazma, Orel, Kursk, Kharkov and others still blocked the way, preventing them from using communications essential to the continuance of their offensive and leaving in Ger. hands springboards for the much-heralded Spring counter-offensive.

By 1942 allied war supplies were pouring into Russia in ever-increasing quantities via Bandar Shahpur on the Persian Gulf and the Trans-Iranian railway. Transported across salt marsh and desert to Ahwaz, road and rail convoy there joined the flow of supplies carried by riv., all thence continuing N. to the U.S.S.R. Brit. and Amer. war equipment was also reaching Russia's arctic ports in convoys after hazardous passages around the North Cape. These supplies were soon to change the Russian army from an almost immobile force to one capable of manoeuvre.

The Battle of Kharkov—Fall of Sevastopol—German Offensive in the Don Region.—The Russians anticipated the German spring offensive by launching (May 13) an offensive, on a 50 mile front, in the Kharkov region. This offensive by Marshal Timoshenko was a counter-move to the formidable Ger. drive in the Kerch peninsula, where the Russians were driven back by combined Ger. and Rumanian forces to the coast of the Sea of Azov. At one time the Russians were actually fighting near the outskirts of Kharkov, but, though many Ger. prisoners and much material were captured, Timoshenko did not succeed in taking the city itself. His attack, however, which, by May 17, extended along a 100-mile front between Myelgorod and Smiyev (40 m.

N.E. and 20 m. S.E. of Kharkov), aimed at enveloping Kharkov from the N. and S. and engaging the main Ger. forces under Marshal von Bock rather than attacking the city itself. In the first five days of the battles for Kharkov 12,000 Ger. soldiers were killed, with the loss of 400 tanks and 150 aircraft; but the Russian losses were not much less, for wherever the Russians advanced the Gers. threw in reinforcements of men and material, particularly tanks. On May 19 von Bock delivered a heavy counter-attack in the

crossings and threatened to cut off large Russian forces in the Izyum-Barvenkovo area, but these forces were relieved by a force of tanks and infantry even larger than those of the enemy. The strategic purpose of Timoshenko's attack in the Kharkov battles was to counteract the Ger. plans for a great offensive against Rostov in preparation for a drive on the Caucasus—for which plans the Gers. had massed 500,000 men, comprising 30 infantry divs. and 6 tank divs. By the end of May the losses on both sides were



Imperial War Museum: Crown copyright

A CONVOY OF SUPPLIES ON THE PERSIAN ROUTE TO MOSCOW

Donetz region around Izyum, 70 m. S.E. of Kharkov and at Barvenkovo 20 m. S. of Izyum. Meanwhile bitter fighting was still raging in Kerch, where Gen. Kozlov's rearguards inflicted heavy casualties, but the Russians lost a great many prisoners. There were numerous spectacular air fights, the Russian Stormovik dive-bombers proving effective against tanks, while Brit. Hurricanes, and Amer. Tomahawks and Alcobras were also used. The Gers. now hurled masses of tanks into the Izyum-Barvenkovo region in an ambitious attempt to break through S. of Kharkov and envelop Timoshenko's forces; but massed Russian artillery and anti-tank guns successfully held these formidable thrusts. Both sides brought up great reinforcements of tanks and planes and the toll of casualties continued to rise in what was proving one of the bloodiest of all battles. The Gers. made great efforts to force the Donetz

enormous—the Gers. lost 90,000 killed and captured, the Russians 75,000. The next great battle was for Sevastopol, which began early in June with air raids on the beleaguered city and the mass concentration of great quantities of siege guns and other artillery. The Ger. attacks were, as usual, carried out without regard for losses—thus 6,000 Gers. were killed by the Russian garrison in one day alone. On June 10 the Russians repulsed seven Ger. attacks and in one period of three days' fighting the Gers. lost nearly 15,000 killed. Gen. Mannstein, commanding the attack, had some 10 divs., numbering between 130,000 and 150,000 men and, like von Kleist at Kharkov, was always ready to throw in fresh reinforcements of all kinds in seemingly unlimited numbers. Meanwhile, on the Kharkov front, where after three weeks the fighting had slowed down, the Ger. infantry and tanks now tried to recapture strong points in their second

line of defence which had been taken by the Russians. In his counter-offensive on this front von Bock was using strong tank formations, with massed artillery. His tactics represented, in effect, a modification or extension of the original spring plan which Timoshenko's Kharkov battle rendered expedient. He was, in fact, compelled for the time being, to join battle further N. than he had intended. His original plan had been to strike at Rostov through the Donetsk basin and, simultaneously, to cross the mainland from the Crimea. That he would pursue this plan as soon as he had sufficiently restored his positions in the Kharkov region was as certain as that the main battle for the Caucasian approaches was now joined. Now, at last, with the imminent fall of Rostov, and the loss of numerous tns. in the Donetsk basin had come the great struggle, with the Russians always stubbornly retreating before far superior numbers and equipment but yet always keeping their armies intact—a consideration of far greater importance than the retention of tns. and ter. Mid-June saw the resumption of most savage fighting both on the Kharkov front and before Sevastopol. Furlous hand-to-hand fighting raged outside the famous city of the Crimea in which thousands of Ger. and Rumanian soldiers fell. Heavy toll was taken of Ger. lives also by the guns of the Black Sea fleet but, notwithstanding the resolution of the garrison and of the crews of the ships, the Ger. hordes steadily penetrated the Soviet defensive positions. The Russians tried to make landings from the sea at Eupatoria, Yalta, Kerch, and Mariupol, but without decisive results. On June 20 eight Ger. attacks were beaten off, the garrison in historic Balaklava resisting the most intense gunfire, while Russian marines, landed from a cruiser, struck heroically at the enemy N. and S. of the city and at the cost of still more heavy casualties, the Ger., after ceaseless air bombing and artillery fire, at length succeeded in driving a wedge in the Soviet positions in the Balaklava sector (June 21). Fort Maxim Gorki had already fallen. Fresh units were flung into the battle at Sevastopol on June 23 where the Gers. were now delivering attack after attack over heaps of their own dead. The tn. had ceased to be practicable as a naval base, but supplies and reinforcements were brought in by sea, while children and old people were evacuated. By the last days of June the city area of Sevastopol had been practically destroyed by bombing and shell fire, though the garrison, with forlorn courage, continued to repel waves of enemy infantry and tanks. Elsewhere the position, from the Russian standpoint, was no better, for on the Kharkov front von Bock's offensive was still heavier than in the Izyum-Barvenkovo battle, and the Russians were forced to evacuate Kupiansk, an important rail junction, some 60 m. S.E. of Kharkov; but at least Marshal Timoshenko's armies still remained intact.

Sevastopol fell early in July, but the

news of the fall affected the Soviet people less than the tales of its heroic defence, which moved them more than any other event of the war, adding, as they did, yet another epic to Russia's splendid past. A few days later the Gers. delivered an attack of great violence from the Kursk-Byelgorod area, due N. of Kharkov—their immediate objectives being the important railway junction from Voronezh to Moscow in the N. and to Rostov in the S. and the Don riv. In the Kursk region the Gers. attacked with more than 1000 tanks and soon made a deep penetration of the Russian front—their customary tactics in the first stage in armoured warfare. The tremendous weight of the Ger. attack was unparalleled even in this war, and it overrode Soviet resistance in some sectors where, however, the Russians fought effective delaying actions in a most stubborn defence, which restricted the tempo of the Ger. advance. But the Gers. made rapid progress all along the Don from Voronezh to Svoboda, Boguchar and Millerovo, and by mid-July the main battle extended from the junction of the R. Boguchar with the Don to the Sea of Azov, including the Donetsk basin, the Russians retreating to their main prepared line, 200 m. long, along the lower Don—the strongest natural defence line for approaches to the Caucasus since the Dnieper was abandoned in 1941. Apart from severe fighting round Rzhev and near Orel, the fiercest struggles in the next ensuing weeks were the battles for Rostov and Voronezh. The capture of Millerovo, where the railway from Voroshilovgrad meets the Moscow-Rostov railway, placed those parts of the E. Don basin still held by the Russians in a precarious position. The German advance was most methodically planned and powerfully supported, and the Ger. commander no longer repeated the error of sending tank columns far afield without heavy infantry and artillery support. The outstanding feature of the Don battle up to mid-July was Marshal Timoshenko's skilful conduct of the very difficult operation of retreating under pressure methodically and without disorder, which suggests that a withdrawal was foreseen as probably necessary. The hope of Russia's allies was that, if his armies could reach the lower Don essentially unbroken, the Gers., after their expenditure of men and materials, would be no nearer his defeat than before and must fight the battle all over again with Timoshenko holding more favourable positions than before. If, however, the Gers. succeeded in effecting a permanent landing behind the Don, or forced the riv. near its mouth, the position would be changed radically to Russia's disadvantage. In the tremendous battles fought between May 15-July 15 the Ger. losses in killed, wounded and prisoners, were 900,000 officers and men. Of these no fewer than 350,000 were killed. In addition the Gers. lost 2000 guns of all calibres, 2900 tanks and at least 3000 aircraft. The Russians lost during the same period 399,000 officers and men in killed, wounded and missing, 1905 guns, 940

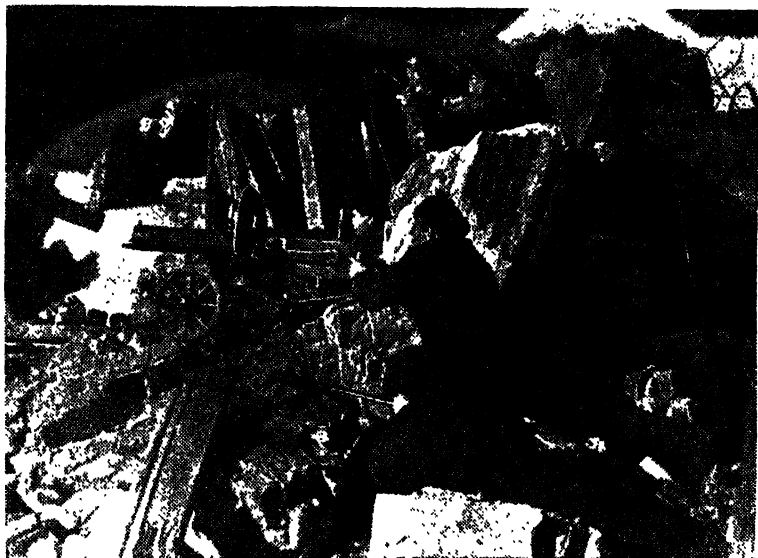
tanks and 1354 aircraft. The disparity in losses affords some indication of the improved organisation and power of resistance of the Red Army which forced the Gers. from the first to throw into action their main forces and reserves, to advance far more slowly than before and, in the course of the fighting, to suffer enormous and irreplaceable losses in men and material. However, notwithstanding losses, the Ger. armies continued to advance and the Russians to fall back. By the early days of Aug. two great battles were being fought in the S.—the battles for the Volga and for the Caucasus. The threat to the whole position of the Soviet became obvious, for the relentless advance seemed not unlikely to mean the isolation of the Caucasus and the forcing of a salient between Gen. Lvov's army there and Timoshenko's forces defending the Volga. Stalingrad, the great riv. port manuf. and business centre, was now von Bock's immediate objective: but Timoshenko offered a stubborn defence, particularly at Kletskaya, in the hope of diverting the enemy's main blow southward against Kotelnikovo, which lies 100 m. S.S.W. of Stalingrad. In the N. Caucasus the Ger. forces under von Kleist were threatening the oilfields of Maikop and the city of Krasnodar, having added thousands of sq. m. of Russian ter. to the 30,000 sq. m. they had already seized N. of the Don since the spring advance. The Kuban Cossacks fought with characteristic bravery, but the rich Kuban steppe, with its comfortable vills. and settlements, was being turned into an inferno of conflagrations. Ger. parachutists sought to sow panic in the ranks of the Russian rearguards by setting fire to homes and fields behind the battle line. But grave and far-reaching as were the Ger. successes in N. Caucasia for the cause of the United Nations, it was realised that the battle for Stalingrad was far more momentous. Wisely Timoshenko had elected to direct all his limited resources towards the defence of Stalingrad and the Lower Volga. Meanwhile, von Bock was anxiously launching unsuccessful counter-attacks in the Voronezh region. Heavy reinforcements, however, continued to reach his powerful army in the Don bend (round Stalingrad), but attacks delivered five or even ten times a day on a broad front failed to break the Soviet defence. About Aug. 13, Marshal Timoshenko's forces, counter-attacking in the battle for Stalingrad, routed powerful forces of Ger. tanks and improved their positions near Kotelnikovo, while, at the same time, the Russian attacks on the Voronezh front grew in intensity.

The battle for Stalingrad and the invasion of the Caucasus.—In the autumn the chief objectives of the Ger. invaders were Stalingrad—a narrow city on high ground stretching for 20 m. along the W. bank of the Volga—the Grozny oilfields, and the Black Sea port, Novorossiisk. The Gers. were not able to attack all along the E. front, as they had done in 1941; instead, they adopted the plan of concentrating their maximum strength in the S. on very narrow fronts and else-

where acting on the defensive, notably at Voronezh and at Rzhev. The main object of the Ger. offensive of 1942 was, however, not the occupation of the oilfields, but to outflank Moscow from the E., to cut off Moscow from the Urals, and then to strike at the city itself. The Ger. advance southwards towards the oil regions aimed not so much at occupying those regions, which were an auxiliary objective, as to the diversion and encirclement of the main Russian forces to the S. in order to bare the Moscow front. In connection with the thwarting of this plan the importance of the Russian attack at Voronezh cannot be overrated. In the vicinity of Rzhev Gen. Zhukov delivered an effective counter-offensive in the triangle formed by Gzhatsk and Vyazma with Rzhev. Further N. there was occasional activity in the region of Lake Ilmen. But it was the battle for Stalingrad which dominated everything, and gradually, as the months wore on, the name of the city assumed almost a symbolic significance. Therefore, the Ger. forces had pushed on inexorably and the fate of Russia might well seem to have hung in the balance on the day of Aug. 22, when Marshal von Bock ordered a general assault and, with 1000 aeroplanes, set a large part of Stalingrad on fire. But now at length the Russians stiffened their defence, rising superbly from the ruins of the stricken city and thenceforth contesting every yard of advance. In the first phase of the battle, round Kotelnikovo, the Ger. forces suffered a sharp defeat, the scene presenting a desolation of charred wheat, a sordid litter of smashed tanks, scorched and splintered undergrowth and numerous corpses blackening in the burning sun. A new Ger. offensive, however, began from the S.W. of the city on Aug. 31 after a brief lull following the almost complete destruction of Kleist's 14th Panzer Div. For hrs. the defence stood firm and the Ger. attacks broke against the Russian heavy guns and mortars. N.W. of the city von Bock delivered an equally determined attack, but met with still stiffer resistance. In the general result, however, this double threat to Stalingrad had become gravely accentuated by Sept. 3. The next day the Gers. attacked again with very powerful air forces and a constant stream of ground reinforcements. Von Bock had received orders from Berlin to take the city at all costs and destroy the Russian forces there and in the whole of the Caucasus. Satellite troops, composed of Rumanians, Its., and Hungarians, were sacrificed remorselessly. The battle for Stalingrad had become one without precedent in the three years of war—the very touchstone of the fortunes of the United Nations. Lodged deeply within the city's defences Ger. mechanised vanguards wormed their way through to the approaches of Stalingrad and, turning E. and W., sought to tear open the Russian lines and force a path for the large infantry forces lying in front of Kotelnikovo and along the railway to Stalingrad. By the end of the fourth week of this titanic struggle more than 20 Ger.

divs. were opposed by a rather smaller force of Russians. Day after day Bock used shock tactics in the hope of taking the city after only a short struggle; but he was gradually forced to begin siege warfare, for the Russians had learned that the offensive spirit of the Ger. infantryman was low unless he was well backed up with machines. Moreover, the Russians were now not only accustomed to tank attacks, but were also resisting the dive bombers with greater resolution. Bock constantly brought up fresh troops under cover of

reaches of the riv. Meanwhile, in the Caucasus, the sustained and vigorous defence of the Grozny oilfields and mt. passes threatened the Ger. time-table, and elsewhere, at Rzhnev and at Voronezh the Russians still held the initiative. Yet despite the heaviest losses the Gers. continued to pour in fresh troops to the attack on Stalingrad. Through clouds of dust and rubble of shattered houses Ger. infantrymen, encouraged by specious promises of extra pay and furlough, crept forward with tommy-guns through the



Soviet Weekly

RED ARMY MEN ATTACKING IN A RUINED FACTORY IN STALINGRAD

darkness, but the Russians were still securing a huge flow of reserves and supplies by the circular railway which entered the city in the N.W. and S.W. There was still no sign that either of the foes was reaching the end of his resources or of his fighting spirit. The closer the Gers. approached the city itself the more obvious was it that the Russians would defend it street by street and block by block. Bitter street fighting followed a Ger. break-through into the N.W. (Sept. 17). But the Russians were determined to resist a *outrance* and the road of retreat was barred to the defenders by the will of the whole Russian people. There was no thought but to wear the enemy down by the vigour of the defence and the power of counter-attack. Nor did the Soviet Gov. conceal their acute anxiety about the fate of Stalingrad or the importance which they placed on the control of the lower

Soviet lines. Every pile of rubble, every crater in the broad streets, every window in the battered houses, however, was a Russian point of resistance. Furious air fights between Amer. built Alcobras and Russian Yaks, on the one side, and Ger. Messerschmitts and Junkers on the other, went on all day. Houses were rent asunder, streets collapsed, and the fronts of factories fell as if undermined by an earthquake. The city, which was the especial pride of the Russians, had now become a smoking cauldron in which two armies were locked in a frenzied struggle for the mastery. And now at this climax Stalin called on the troops of the city to attack and to recapture every lost position while, at the same time (Sept. 19) the Soviet Army launched a new offensive in the Voronezh region from four or more directions with a view to relieving the position at Stalingrad. Meanwhile the

city was rapidly being converted into a honeycomb of defences in preparation for battles for every house and every storey. Relentless fighting was proceeding on the featureless steppe away from the city itself, where troops could move only with the greatest risk. Here around windmills and piles of shattered guns, among the bodies of the unburied dead, the Russians were now attacking with the utmost ferocity. The noise of the battle was probably quite unprecedented in warfare: an appalling roar compounded of the harsh din of the heavy tanks, the incessant stutter of machine-guns and the whining zoom of hundred of aeroplanes fighting large air battles in formation. Only in the rare lulls did the screams of the dying and the moans of the battle-crazed reach the ears of the combatants. The area of this remarkable battle now extended along a 40-mile belt of country along the bend of the Volga, comprising Stalingrad itself and clusters of satellite vil. settlements. At right angles to the riv. ran numerous deep ravines. For weeks the whole of this region had been mercilessly bombed by the Gers. and by now (Sept. 24) the terraced houses, quays, embankments, and factories of Stalingrad were shattered beyond recognition. The whole region of Stalingrad had become a battlefield. It had no inhab., only defenders. The position inside Stalingrad was at its most critical point on Sept. 26, when, in spite of a Ger. reverse in the 24th, the garrison found itself being overwhelmed by the tremendous onslaught. But at this juncture the 13th Div. of the Guards, under Gen. Rodimtsev, reached the E. bank of the Volga opposite the city after a series of forced marches and were rushed up from the rear in lorries and every vehicle imaginable in a manner almost reminiscent of Gen. Gallieni's Paris troops in the first battle of the Marne in 1914. Some regiments were landed in the N. and some in the S., as the Gers. had broken through to the riv. and controlled part of the bank in the centre. This was the period during which the Gers. plausibly claimed to have cut the city in two. Both halves of the Guards Div. then attacked and cleared the enemy from the Volga bank, joining up to form the first Soviet line inside the city. Fighting with their backs to the riv., they gradually drove further W. until they had secured more room for tactical movement. Their great feat was the seizure of 'Iron Hill,' which dominates the city and long stretches of the riv. Their spirit infused the whole of the defending force and from the moment of their dramatic intervention the Russian resistance in Stalingrad stiffened.

A lull in this frenzied and protracted struggle only came on the fifty-first day of the battle. Repeatedly, during these seven weeks the Gers. strove to pierce the thin Russian front and reach the coveted Volga. They showered countless leaflets on the city, calling on the Russians to surrender. The pamphlets lay shrivelled in the hot breath of the blazing ruins, unheeded, and the city still stood. Hist.

may well ask how Stalingrad withstood protracted attack by such a preponderance of tanks and infantry, supported always by a greatly superior air force. Guns were the real mainstay of the Russian defence. Their mobility and the open nature of the country allowed them to concentrate in masses on narrow sectors. Thence their fire, often from three or four regiments at once, converged on the great German tank columns as they streamed across the steppe. And now, as winter approached the Gers.' chances of taking the city dwindled. Every yard of advance was contested, every factory wall defended to the last; especially fierce was the struggle for the 'Red October Factory.' But Nov. came with Hitler's boast at the end of Sept. that Stalingrad at least would fall still unfulfilled. Meanwhile Marshal Timoshenko's relief force was slowly advancing from the N.W.

In Aug. Gens. Zhukov and Konev had succeeded in cutting the single line between the Itzhev region and the main Ger. armies there and to the S.W. Here too there was desperate street fighting the city being of the highest strategical importance and containing an enormous supply of stocks accumulated in the previous autumn when it served as the base for von Bock's and List's expeditionary forces against Moscow. But while Zhukov was making headway here in the centre of the E. front, Marshal Timoshenko's forces in the S. were forced to withdraw to new positions covering Stalingrad. Meanwhile heavy fighting was also in progress still further south, where the Gers. were advancing on Novorossisk and Tuapse, port for the Maikop oilfield on the Black Sea and on Mozdok near the Grozny oilfields. But here again, at Mozdok, the Russians stood firm as at Stalingrad and for weeks the attacking Ger. forces made no appreciable advance, until late in Nov., when they took Nalchik and advanced to Ordzhonikidze and the all-important Georgian military road, which leads directly to Tiflis. But here they were pulled up by a brilliant counter-offensive at Ordzhonikidze and routed in such decisive manner as to end the danger to the Grozny oilfields, at least for the winter. In their retreat the Gers. abandoned nearly 150 tanks owing to lack of oil fuel. But a still more dramatic change came over the S. Russian front from Nov. 19 when the Russian troops at the approaches of Stalingrad passed over to the offensive both from the N.W. and from the S. of the beleaguered city. In a few days they had broken the Ger. line in the N.W. on a 20-mile front and on a 15-mile stretch in the S., advancing from 40 to 50 m. They occupied the tn. of Kalach on the Don and the tn. of Abganerovo, thus cutting both railway lines supplying the Axis forces on the E. bank of that riv. On the fifth day of the offensive, Stalingrad's battle-worn defenders were at last relieved, when a Russian army broke through to link up with them from the N. and they themselves then joined in Marshal Timoshenko's great offensive. The result was that the Axis

forces were now facing an increasingly precarious position with Russian armies closing in behind them across the Don to the W. At the end of a week some 51,000 Axis prisoners were taken and 46,000 men killed, besides 80,000 wounded. The booty included nearly 400 tanks, 1300 guns and over 5600 motor vehicles. Near Kletskaya on the Don bend N.W. of Stalingrad three entire Ger. divs., together with their generals, surrendered on Nov. 24. This change in the fortunes of the Russians was an indication of effective unified strategy on the part of the United Nations, for it followed immediately on the Brit. defeat of Rommel in the battle of Egypt and the successful landing of large U.S.-Brit. expeditionary forces in Morocco and Algeria.

Russian Counter-offensive.—Destruction of Ger. VIII Army.—Fall of Rostov.

Following orthodox strategy the Gers., in the early summer of 1942, had concentrated their strength for the blow at their main target, Stalingrad, on a 200-mile front from Izyum to Kursk. They drove E. and S.E., following the two main railways to Voronezh and Rostov respectively, their right flanking out, as it passed the industrial trns. of the Donetz, in order to try to encircle the Russians retiring on Rostov. But the Gers. were held at Voronezh by Gen. Golikov, and, as there was no other W. to E. railway in Ger. control for the next 200 m. southwards, the Ger. main concentration was switched southward to follow the railways to Stalingrad. Thus Rostov was taken and the Gers. rushed forward up the Salsk-Stalingrad railway, and it was then that the Ger. High Command boldly broadened their whole plan, abandoning orthodoxy and over-reaching themselves. For they now aimed, not only at taking Stalingrad, but at cutting off Russia from her oil and from her Brit. and Amer. supplies, separating the Central European part of the Soviet Union from the Volga and the Ural area and surrounding and taking Moscow, and so putting the Russian armies out of the war. But the Russian High Command had observed that the Ger. troops were really insufficient for the 900-mile front N. of Kursk and, behind these lines, the Russians were left in comparative peace to withdraw, train and move reserves as they chose. In sharp contrast to the Ger. was the Russian strategy, which aimed at surrounding and routing the Ger. forces on the approaches to Stalingrad. This plan was effected in Nov.-Dec. 1942 in three stages. The first was the Russian offensive N.W. and S.W. of the city, which has been described. The task of routing the Ger. flank groups on the approaches to Stalingrad and surrounding the principal concentrations on those approaches was successfully executed by the troops operating in the N.W. of the city. The second stage was the Russian offensive in the area of the middle Don (Dec. 16-30). The Russian troops here were assigned the task of penetrating to the rear of the Ger. troops in the Don bend and preventing those Ger. troops which were surrounded

on the approaches to Stalingrad from escaping or being relieved. The third



Soviet Weekly

TROOPS OF THE RODIMTSEV
DIV. ON RECONNAISSANCE IN
STALINGRAD, WINTER 1942

stage was the Russian offensive S. of Stalingrad. The Ger. command, having led their troops (the Sixth Army) at

Stalingrad into a cul-de-sac and having brought them to the brink of a catastrophe now made a desperate attempt to relieve them. With that object in view, they concentrated a considerable force N. of Kotelnikovo, and on Dec. 12 launched an offensive. The Soviet troops, however, routed this new concentration, rolled the Gers. S. and so deprived them of the last chance of breaking through to the encircled Sixth Army. In all, during these three stages of their offensive to the end of 1942 the Red Army routed 36 enemy divs., including 6 tank divs., besides inflicting heavy losses on 7 others. During the same period the Ger. and satellite troops lost a total of 175,000 officers and men in killed and 137,700 prisoners; while the Russian booty included 542 aircraft, 2064 tanks, 4451 guns, 138,000 rifles, 5,000,000 shells, 2000 railway trucks and much other material besides the destruction of 1249 aircraft, 1187 tanks, and 1459 guns. The general direction of these successful operations was in the hands of Gen. Zhukov, the celebrated defender of Moscow. Towards the end of Jan. 1943 the Russians had, in the main, completed the destruction of the Ger. Sixth Army, which was commanded by Gen. Paulus. 600 Ger. transport planes, sent to relieve the trapped army, had been destroyed. Famine, disease, and Russian bombs and gun-fire had, by mid-January, reduced an army of over 300,000 to between 70,000 and 80,000 men. Those that remained rejected a Russian ultimatum to surrender and the Russians then launched a new and final attack of annihilation. At this date numerous Ger. officers were escaping by air or surrendering. The fire of the few remaining forces was now obviously weakening, and, on Jan. 31, the Russians captured Field-Marshal Paulus (he had been given that rank by Hitler a few days previously), 15 generals and the remnant of the Sixth Army. In the course of the general offensive against this army, the Russians had captured 46,000 prisoners in all; the inference, therefore, is that most of the rest were killed. Catastrophic losses in equipment and prestige, apart from the loss of men, were incurred by the utter collapse of the Ger. Stalingrad expedition. On this same day the Ger. position in the Caucasus was rendered still more precarious by the loss of the junction of Tikhoretsk and the clearing of the Maikop oilfields. The blow which stunned the Ger. will at Stalingrad seemed, indeed, to have affected the command of the whole S. front, including the Caucasus. A confident army, flushed with victory, experienced a transition from a wholly offensive to a wholly defensive force. Certainly winter conditions were partly responsible for the change in mind, but the chief factor was just as certainly the Russian method of offensive warfare, which Gers. had not previously experienced. That the powerful, experienced Sixth Army, copiously equipped, as few field armies have ever been equipped before, with guns, armour and munitions for the reduction of Stalingrad (confi-

dently promised by Hitler) could allow itself to be so effectively enveloped and then completely destroyed would have been pronounced no less fantastically ridiculous by any Ger. soldier or civilian than the idea of its total eclipse would be extolled—as it was—in Berlin as 'a proud epic of Ger. military hardihood.' But the fact is that the Gers. did not believe that the Russians could have any really formidable reserve armies and so had not made any adequate emergency dispositions beyond extending the scope of an elastic 'hedgehog' system, which had proved effective in the winter of 1941-42.

Before Marshal Voronov and Col.-Gen. Rokossovsky had reached the point at Stalingrad that they must pause to bring up materials and regroup for their next offensive, Gens. Vatutin and Golikov were attacking westward and driving the Ger. forces out of the Don bend; while, soon afterwards, Gen. Eroshenko (commander of the S.W. front in the Stalingrad battle) and other generals attacked again from the Kotelnikovo region towards Salsk and Rostov and before even this attack had reached its height, another army on the Voronezh sector forced the Gers. and Hungarians to retreat rapidly and yield essential railways. And at the same time the Russians were prosecuting operations on the middle front so that the Gers. were unable even temporarily to weaken that front by sending reinforcements S. In one of these central front attacks the Russians captured Veliki Luki, a most important stronghold, and in another they reduced Schlisselburg, the fortress tn. eastward of Leningrad and so reopened a land-corridor to the long besieged garrison and inhabitants of that great city (*see further under LENINGRAD*). Altogether less dependent on railways than the Gers, the Russians, accustomed to large-scale operations across their native winter countryside, were now demonstrating that their soldiers were not only better officered for such warfare but were more than a match for Ger. soldiers on the open steppes. The next places to fall were Izyum in the Kupiansk region (Feb. 9), Stary Oskol, 50 m. W. of Voronezh, the port of Azov, 10 m. S.W. of Rostov, and, in the first fortnight of Feb., the important tns. of Kursk and Byelgorod, the capture of the last-mentioned place increasing the threat to Kharkov from the N., Kupiansk, Lozovaya (increasing the threat to Kharkov from the S.), Bataisk and Novochoerkassk, which brought the Russians to the gates of Rostov, and Krasnodar, a large tn. which gave them control over the Kuban riv. country. Thus, by this time the Russians were threatening the entire Donetz basin and the whole of the W. Caucasus, having recaptured in three months of winter all the ter. that the Gers. had taken in five months in 1942. The Russian victory at Krasnodar was the crowning achievement of the Caucasian armies' three month offensive—one of the most remarkable campaigns in modern military hist. It was characterised by deep raids, decisive pioneer tactics and great endurance on the part

of the men in overcoming great natural obstacles. The new tactics of the Russians overcame many obstacles which had long blocked their path. Thus, the fall of Kursk and Kramatorskaya removed two vital pins on the extreme end of a 220-mile front and, as a result, the Russians now enjoyed a wider freedom of manoeuvre. Flying columns of tanks, motorised infantry and ski troops all played their part in the complicated moves by which forces, simultaneously attacking from various directions, first encircled and then captured these strongholds. On Feb. 14 Rostov was taken by the forces under Col.-Gen. Malinowsky and on the same day the fall of Voroshilovgrad, 70 m. N.W. of Rostov, gave the Russians a key point on the railway to Kharkov. The recapture of Rostov was a heavy blow to the Gers. and set the seal on the remarkable recuperative power of the Russian people, the stoicism of their forces and the strategical skill of their generals. The most violent battles for the city occurred on the I. b. of the Don particularly in the Bataisk region. A powerful Ger. force massed N.E. of the city threatened the Russian right flank, but Malinowsky forestalled this move by cutting the Rostov-Novocherkassk railway, while another force led by Cossacks, crossed the ice on the Don delta near Azov and took a key position S.W. of the city. Then Malinowsky made a frontal attack on the centre, the Don was crossed and the S. part of Rostov captured including the railway station, while the rail connection with Taganrog was cut and Novocherkassk taken in a night attack. The rest of the city soon fell and the Gers. retreated in disorder. With its fall and that of Voroshilovgrad and Voroshilovsk the entire Ger. position in the Donetz basin was threatened and Russian forces were closing in rapidly on Kharkov, their successes placing them in an unbroken arc round the city. This great city, the third in importance in Russia, fell to the Russians on Feb. 16 after a determined attack which led to fierce street fighting. The operation which liberated Kharkov, though only for a month, and the routing of the Ger. forces in the area was the achievement of troops commanded by Col.-Gen. Golikov. Snowstorms raged during the later stages of the battle, but they did not impair Russian mobility. Golikov drew the main Ger. forces to the E. and S.E. of Kharkov and then struck decisively from the N. The city itself was protected by three defence zones, and before these were reached, the strongholds of Byelgorod, Volchansk and Chuguyev had to be taken; but always the strongest Russian blow was being prepared in the N. and N.E. Ger. aircraft played an active part in the defence of Kharkov as the Russian concentric attacks closed in on the city, and every man available for the front was mobilised even to the members of the gestapo. But Russian aircraft maintained their supremacy and heavy Russian tanks and self-propelled artillery swept into the city unexpectedly from the

S.W., while the main forces were fighting their way down from the N. Street fighting lasted for a day and a half, at the end of which the city was in Russian hands. As they fled the Gers. fired and mined all the finest buildings. The central part of Kharkov was now but a shell and all the railway lines had been removed to Germany.

While the Russians were pursuing the garrison of Kharkov westward, a new offensive was in preparation further N. under Marshal Timoshenko. This offensive was launched late in Feb. between Leningrad and Moscow, the Gers. being driven out of an area of 900 sq. miles in a few days. The following day Timoshenko captured the stronghold of Rzhev, 2000 of the garrison being killed; and the next day, continuing their advance W. of Rzhev, the Russians cleared the whole length of the railway between Moscow and Velki Luki. The position of the Gers. defending Orel had now become perilous. The mild winter and thaw, however, stopped further advance by the Russians in the Ukraine and their lengthening communications constituted a danger irrespective of the weather. Early in March they were faced with a concentration of 25 Ger. divs.—many brought up from the W. of Europe—on a narrow sector in the Donetz Basin and were forced to retreat towards the N. bank of the Donetz, evacuating Krasnodar, Lozovaya, Pavlograd, Kramatorskaya, Barvenkovo, and other towns W. of Moscow, however, they made further advances, particularly towards Vyasma, which they entered on March 12. Ger. resistance around Orel, however, was now stiffening. S. and W. of Kharkov the Russians were being very hard pressed. Notwithstanding the heroism of the Russian gunners and 'tank-busters,' the Gers., by sheer weight of armour and control of good roads, pressed relentlessly on Kharkov, neither side counting the cost in a great battle which increasingly assumed the character of tanks versus guns. The Gers. had an unprecedented number of machines concentrated on a very narrow front, with strong infantry and aircraft support. The Russians massed guns at vital points and inflicted heavy losses, but the Gers., undeterred by mounting casualties, resumed their attacks again and again and by March 15 had recaptured most of the city. The powerful Ger. recoil of Feb.—March eliminated the threat of envelopment to their armies between the Donetz and the sea and cut off, with considerable loss, some of the advanced Russian columns. Above all, it inflicted on the Russians a bitter disappointment in the subjugation of Kharkov again so soon after its dramatic liberation. But although the Gers. had, by the end of March, re-established their position along the line of the Donetz to N. of Taganrog, they were not appreciably better off in the matter than when they set out for the Volga and the Caucasus the previous year and, in their existing situation, this was equivalent to a heavy strategic defeat on the result of the whole period. It is generally surmised that Russia's

total casualties at this point were about 6,000,000. The Ger. losses were not much lower, but their man-power problems were much more intractable than those of the Soviet.

The Kursk-Orel battles.—The capture of Kharkov was the high-water mark of the Russian offensive in the Donetz region. At one time, for a fortnight, they held the entire course of the Donetz riv. The dense railway network of the Donetz industrial basin was in process of envelopment by two strong arms—under Gen. Malinowsky and Gen. Vatutin respectively operating towards Taganrog and Sineelnikovo—within which the Ger. armies were being destroyed. Other Russian forces, 20 m. N. of Taganrog, had crossed the Mius riv. Gen. Popov took Krasnoarmeisk and Vatutin occupied Pavlograd just N. of Sineelnikovo and Krasnograd, while Gen. Golikov advanced on Poltava. Already the Russians held Zenkov, Akhtyrka, Lobedin and Sumy to the N.W. of Karkov. The entire Ger. forces E. of the Dnieper bend were on the verge of a disaster exceeding that of the Sixth Army at Stalingrad. But at this point fortune deserted the Russian arms. The unusually early end of a remarkably mild Russian winter left the Russians at a great disadvantage, and their mobility was abruptly checked by ground softened by melting snow. As the already overworked Russian armies now unexpectedly and perforce came to a halt the Gers. gained time to regroup and reinforce. They quickly launched a counter-stroke from within and outside the Donetz basin and the Russians, realising the impossibility of their situation began a withdrawal. Krasnoarmeisk, Pavlograd, Krasnograd and Lozovaya were abandoned. Manstein, instead of commanding a defensive retrace, now drove offensively towards the Donetz and Kharkov, with a strong force brought by rail from the Dnieper bend with ample armour and air support. The Gers. indeed had long prepared this counterstroke, and it is not a little surprising that it was delayed as long as it was. Kharkov and Bielgorod soon fell to Manstein. Kramatorskaya and Slavyansk were abandoned. The first week of April found the Russians, however, still holding bridgeheads on the r. b. of the disputed Donetz area, chiefly in the Izium and Chuguyev sectors, and the Gers. launching repeated attacks towards Izium. The Russian positions on the lower Donetz and down the Mius to the Azov Sea remained firm and Voroshilovgrad was still in Russian hands. Between that time and early July there was a lull on the whole front. The only marked activity was in the Kuban region. Here the forces of Gen. Maslennikov were pounding Novorossisk, while the Gers. and their satellites launched frequent and furious counter attacks. It may be noted here that at this date (June 22, 1943) the Ger. losses during the two years of war in Russia in killed and prisoners were 6,400,000 against the Russian loss of 4,200,000 killed and missing. The Gers.

lost during the same period 56,400 guns, 42,400 tanks and 43,000 aircraft. Russian losses in war material were 36,000 guns, 30,000 tanks and 23,000 aircraft. Then came the spectacular Ger. Kursk-Orel offensive, which began on July 4—a delay explicable only on the assumption that their plans were affected by the early Axis collapse in Tunisia and probably by the withdrawal of many satellite troops from the E. front. If Germany hoped to force an issue on the E. front it could only be on the great Russian salient 130 m. across the chord stretching from N. of Kharkov to S. of Orel.

The ideal aim of this long-prepared offensive, like its predecessors, the offensives of 1941 and 1942, was to smash the Russian armies rather than merely to eliminate the Kursk salient, and to do so before the Allies might launch their 'second front' offensive in Europe—an offensive which, indeed, was already imminent in the expedition to Sicily. Judging by the troops and planes engaged and by the armour thrown in, this was the biggest battle of the war up to that time and the daily casualties indicated that the fighting was of twice the intensity of the Stalingrad battle. Again, from the number of air engagements and aeroplanes brought down, the Ger. air sorties were much in excess of the 2000 daily sorties during the biggest Stalingrad onslaughts and the number of tanks engaged was far greater than anything that was possible in the relatively cramped space of the street fighting of Stalingrad. A considerable proportion of the tanks used, particularly in the first wave of every attack, were 'Tiger' tanks—tanks with a firing power double or treble that of the ordinary or medium tanks used by the Gers. in 1942. One peculiarity of this terrific battle was that the Gers. attacked the very two sectors of the front where the Russians had been expecting them for sev. months and where the Russians had been organising defence in depth with exceptional thoroughness. A certain number of the 1800 Ger. tanks which were crippled or wrecked in the first four days fighting came to grief through blundering on the Russian minefields. Every type of weapon was used in this great battle on both sides—tanks, artillery, planes, mortars, machine guns—but the progress of the battle was essentially determined by the contest between the Ger. tanks and the Russian artillery and other anti-tank weapons. If the Ger. Tiger tanks were formidable, they certainly did not come up to Ger. expectations as a new weapon which should prove decisive in swinging the war in Germany's favour. Moreover, there was now much better co-ordination between the ground forces and the Russian Air Force, and that Force played an enormous part in reducing the effectiveness of the help given by the Ger. bombers to their advancing troops. Air losses were heavy on both sides. But the outstanding feature of the Bielgorod-Orel battle was the tremendous Ger. losses in tanks and the insignificant operational gains. This Ger. offensive differed from those of

1941 and 1942 in that almost from its beginning the Russians, after giving some ground, notably in the Byelgorod region, were soon counter-attacking with such vigour that the Ger. gov. was compelled to try and induce the world to believe that they had had no intention of opening an immediate large-scale offensive until the Russians launched a mighty assault on their positions. On July 9 both sides threw in more armour, while the Gers. were now using some of their operational reserves. Violent fighting broke out in new sectors between Orel and Byelgorod, particularly near Sevsk. During July 11 the Russians continued to repulse great attacks in the Orel-Kursk offensive delivered by tanks and motorised infantry. The Gers. sent into action simultaneously 400 tanks, together with large forces of infantry. Some 182 Ger. tanks were destroyed on that day and over 2000 officers and men were lost. The first week of this great Orel-Byelgorod battle ended without any climax being reached, though the Ger. right arm made some progress between Byelgorod and Kursk. It was, however, significant that already the Gers. were forced to resort to artillery bombardment after their costly armoured thrusts, and that they were even now regrouping their mauled forces. On July 13 the Gers. attempted no major operations in the Orel-Kursk direction, but in the Byelgorod sector they lost 96 tanks in hard fighting. During July 12-14 Russian pilots shot down 156 Ger. planes. The Gers. themselves now began to excuse their failure by reference to the terrible weight of Russian artillery fire in the 'unparalleled duel raging around Orel.' Decisively beaten N. of the Kursk salient, the Ger. general, von Kluge, now tried to widen the Ger. wedge driven towards Kursk from the direction of Byelgorod; Russian counter-attacks here were intensified with the arrival of fresh Russian tank troops. Then the Russians, far from being exhausted by their dour defence, suddenly took the offensive, in two directions from the N. and E. of Orel. In three days (July 14-16) they routed 5 Axis divs., killing 12,000 and taking 2000 prisoners. The tables were now turned on the Gers. with a vengeance, for their very reinforcements were tired and the men's senses had become blunted and benumbed by long periods without sleep in the battle zone. By July 18 the Russians had made such good progress that they were threatening the vital Orel-Briansk railway. Day by day further advances towards Orel were made and scores of inhabited places liberated. Equally important progress was made further S. in the Byelgorod area. With the capture of Bolkhov the chief Ger. resistance N. of Orel was at an end. In ten days' fighting in this great Orel offensive the Russians killed 50,000 Gers. and took 6000 prisoners, together with 372 tanks and 720 guns. The Russians had now recovered all the ground gained by the Gers. on the N. side of the Kursk salient and nearly all their gains in the Byelgorod region. On Aug. 4 the Russians stormed

and captured Orel, which restored to them a valuable railway junction and promised the restoration of through rail traffic on the main line from Moscow to Kursk.

On the same day Byelgorod was also successfully stormed by the Russians. Byelgorod was actually the base of the main thrust of the Ger. Kursk offensive, and it was there that the Gers. had gained a substantial though short-lived success. The immediate result of this second triumph was a big Russian advance towards Kharkov. Simultaneously, the Russians also mastered the concurrent local Ger. offensive in the Donetz basin and on the Mius riv.—the sole Ger. effort to counteract the general Russian surge forward—and, continuing their offensives in the Kharkov and Briansk areas, they liberated daily scores of vils., while inflicting ever mounting losses on the Gers. They then opened a new offensive at Spasdeinsk, 70 m. S.E. of Smolensk—a move rendered possible by the Orel victory—captured the tns. of Akhtyrka and Krasnokutsk and cut the railway from Kharkov to Poltava. The Gers. brought up reinforcements in the Kharkov area in the hope of stemming the Russian drive on Poltava and Dnepropetrovsk and keeping open the last corridor of escape and supply. But savage counter-attacks did nothing to loosen the Russian grip. In six weeks from July 1 to about Aug. 12 the Gers., according to Russian official figures, lost 1,000,000 men. Of these 300,000 were killed, 25,600 captured and the rest put out of action by being seriously wounded. In that period 4600 Ger. planes, 6400 tanks, 3800 guns and 20,000 lorries were destroyed. Vast booty was captured, including 837 tanks and over 1000 guns. Russian losses are unknown.

The fall of Orel and Byelgorod soon had its effect on the co-ordinated Russian operations further S. in the Kharkov region. The value of Kharkov itself lay in the fact that it was the most important centre of communications in S. Russia. It lies in the midst of a vast plain, undefended by any natural obstacles such as steep river banks, woodlands or marshes, which partly explains why it changed hands four times between 1941-13. From the beginning of Aug. (1943) the Russians were pressing hard on three sides of the city, steadily closing in from N. and S. upon its westward or rearward communications, and thereby threatening the garrison with isolation as at Stalin-grad. The Gers. fought for Kharkov with great tenacity, recognising it as the hub of their entire position on the E. front and, about Aug. 10, they began a series of heavy counter-attacks which gained appreciable ground against the Russians enveloping Kharkov from the N. But the Russians soon fought the whole of the counter-attacking armies to a standstill and as their corridor of retreat was now narrowed to only 20 m. the Gers. evacuated Kharkov, the operations in the immediate vicinity of the city lasting only a few hours. An Order of the Day was issued by Stalin announcing that the city had been taken by storm and naming

among the victorious commanders Konev, Vatutin, and Malinowsky. If the city had been gravely damaged by the retreating Gers. one of the outstanding advantages gained by its recovery, apart from the psychological factor, was the command of a first-class strategic railway which this victory, following on those of Orel and Byelgorod, now restored to the Russian armies, and so enhanced the prospects of liberating the Ukraine. Meanwhile in the Donetz Basin, S. of Izyum and S.W. of Voroshilovgrad and in the N. near Briansk, the Russians continued to develop their offensives.

The Donetz Basin overrun.—Late in Aug. 1943 Taganrog was in danger, the Gers. having been deprived of all rail communications with the port. What had seemed to them to be merely subsidiary operations were now developing into major attacks near the centres of the Donetz Basin, or 'Donbas.' The Gers. evacuated Taganrog on Aug. 30. Its occupation by the victorious Russians meant the liberation of all the Rostov region, and, soon after, the Mius defence line, which the Gers. had so stubbornly defended in the final stage of the Russian winter offensive, was now at length broken. The Ger. withdrawal was a preliminary to their gradual evacuation of the entire Donbas; for Taganrog was one of the corner-stones of their defences in that area and its abandonment made a withdrawal also from the Kuban and the Crimea a matter for urgent consideration. Four Ger. divs. were surrounded and routed at Taganrog, 35,000 Gers. being killed. The Russians made their next big advance in the Seversk area, taking the important positions of Klysk and Glnkov and penetrating into the N. Ukraine. They also took Yelnya, a most important fortress in the Smolensk area. This double offensive on the central front was the most extensive the Russians had undertaken since Stalingrad and their largest-scale enterprise in any summer season. With the capture of Sumy—duly celebrated like the fall of Taganrog by salvos of guns at Moscow—the whole of the Kursk region was freed. In the Donbas the Russians next took Lisichansk, Voroshilovgrad and other places and, in an advance along the shores of the Sea of Azov, they took Budennovka (2-3 Sept.). One large city only, Stalino, now remained to the Gers. in the Donbas, their reserves being no longer sufficient to enable them to mount such a counter-attack as that which had retaken Kharkov earlier in the year. Most of their available reserves were now concentrated for the defence of their positions in the region of Poltava and Krasnograd—vitally important to stem a possible Russian attempt to break through to the Dnieper. Stalino was however taken on Sept. 8 after a 12-mile advance in which over 150 inhabited places were liberated. Thus were the Gers. now thrown out of the whole of the Donetz Basin and another salvo of guns was fired at Moscow. The capture of Konotop and Bakhmach N.W. of Kharkov involved a breakthrough

which cut the Gers.' main lateral railway and took the Russians appreciably nearer Kiev.

The opening of the summer campaign, as shown above, was made on Ger. initiative—an initiative strangely delayed. When it came, on July 5, it was evident that the Gers., compelled to look southward by the Brit.-Amer. threat from N. Africa, were mainly concerned to economise troops by shortening their E. line. They had tried first to do so by a forward movement, an offensive delivered with great force against the principal Russian salient, in front of Kursk. But the Russians soon fought this offensive to a standstill and then at once began their own massive counter-offensives. These were all in progress as the Brit. and Amer. forces overran Sicily, and the manifest embarrassment of the Ger. armies in Russia had its effect on the train of events that overthrew Mussolini on July 25. When Kharkov fell on Aug. 23, the Russian line was already in motion towards the vitally important stronghold of Briansk in the centre of the line. From that moment the Gers. began to fall back all along the line, except in the far N., harried at every point by the victorious Russians. Late in Sept. the Russians had taken Briansk and were advancing on Smolensk the gates to which had been burst open by the capture of the outer bastions at Yartovo and Dukhovschina. The capture of Chernigov by Gen. Rokossovsky gave the Russians complete control of the Desna riv. throughout its length, and when, soon afterwards, Poltava fell, the Russians were well advanced towards the Dnieper bend. Smolensk, so long Hitler's headquarters on the E. front, was taken by storm by Gen. Sokolovsky on Sept. 25, a triumph which had a profound psychological effect on the Russian people. Following the fierce three-day battle which resulted in the capture of Poltava, the Russian forces took Kremenchug, the important rail junction on the E. bank of the Dnieper (Sept. 30) and thus now stood on the E. bank of that great natural defensive barrier, facing Zaporozhje and Kiev. Still further S. they captured Novorossisk, the Black Sea port, after a five-day battle in which 4 Ger. divs. were routed, and so increased the threat to the Gers. in the Crimea.

There followed a lull of some ten days—a delusive lull for the Gers., during which the Russians were bringing up great reinforcements. The Ger. armies had, during their long withdrawal, suffered severe losses in rearguard or delaying actions, but they were not routed. Though much weakened, they had avoided disintegration, but they had failed to disengage from their Russian pursuers. Moreover, the plan adopted for withdrawal had the flaw that sound military strategy was subordinated to political and economic necessity; for while they had intended to narrow the front and thereby save man-power by falling back to the line of the upper Dnieper, N. of Kiev, they were nonetheless compelled to hold the 600-mile front of the Dnieper bend or salient between Kiev and

Kherson, the ruling considerations being the grain and manganese ore of the Ukraine and the unstable political situation in Rumania and the Balkans, regions which had to be kept remote from involvement in the war at all costs. This decision, which meant that the Gers. must hold a front at least as long as that which they had held in July, enabled the Russians to maintain, in Sept., a position of great strategic advantage and it was this advantageous position which Stalin suddenly at the end of the brief lull proceeded to exploit along the whole front from Novol to the Black Sea.

Dnieper 'Bend' battles.—Early in Oct. the Russians broke through the Ger. defences W. of Veliki Luki and took Novol, an important rail junction 30 m. S.W. of that place. But their main effort was much further S., where their reinforcements were now streaming across the Dnieper and enlarging a number of bridgeheads N. of Kiev. Their tanks went into action on the W. bank of the river, their guerillas rendering effective assistance. The breaking of the Dnieper Line was the result of a lightning operation that took the Gers. completely off their guard. Fighting through a 30-mile zone of devastation on the l.b., Russian vanguards swarmed across the riv., and the powerful Ger. forces who had planned to take up positions on the high right bank often found themselves cut off and met their fate in the swamps at the hands of merciless guerillas. Despite the deployment of yet more powerful Ger. forces against the Russian bridgeheads, the Russians gradually gained ground and, S. of Pereyaslavl, the riv. crossings were now out of range of the Ger. guns. Meanwhile the Gers. were driven from their last foothold on the Caucasian mainland. Land and sea operations, together with a terrible pounding from 'Stormovik' planes, finally cleared the Taman peninsula, 20,000 Gers. being killed and 3000 taken prisoner. Meanwhile there was fighting of bitter intensity for Kiev, with tremendous air battles over the city; but the main battles of the whole front were those which were developing at ever greater pressure in the Dnieper Bend between Kremenchug and Melitopol. Zaporozhe, the important junction of railways and waterways on the lower reaches of the riv., was captured on Oct. 14 and the railway linking Melitopol with the Crimea was cut at two places, an augury of still greater victories to come. The final storming, on Oct. 23, of Melitopol, the gateway to the Crimea, after eleven days of the bitterest street fighting that even Russia had seen, opened the way across the Nogaisk steppes and threatened 1,000,000 Gers. still fighting in the Dnieper Bend to the N. and in the Crimea further W. The street battles which preceded the capture of Melitopol were probably as desperate as those of Stalingrad. The Gers. had to be cleared from every house and building, and even from the cathedral. The Russian wedge across the Dnieper had now broadened and deepened into a huge triangle 60 m. wide at its base and nearly as deep,

covering hundreds of sq. m. of the W. Ukraine. From its left flank the drive on Dniepropetrovsk had now been launched with strong artillery and tank support along the narrow triangle between the Dnieper and the railway to Krivoi Rog. By Oct. 25 the great industrial centres of Dniepropetrovsk and Dniprodzerzhinsk on the riv. had been taken and a compact wall of Russian armour was pressing forward from Kremenchug, Zaporozhe and Melitopol. The capture of the two industrial tns. was the outcome of careful preparation under Gen. Konev, in which the assault on Zaporozhe and the big Russian drive from Kremenchug played a part in overwhelming Ger. resistance, so that the two cities fell without any violent street battles. The Gers., however, were steadily reinforcing Krivoi Rog, which they evidently meant to hold at all costs. Rightly indeed they recognised that this sector was the most vital of the whole battle area. But they were in full retreat in the area S.E. of the lower Dnieper, while the Red Army under the victorious Russian generals Malinovsky and Tolbukhin, was sweeping on rapidly across the Nogaisk steppe. On Oct. 31–Nov. 1 the Russian troops cut the land retreat for Ger. forces in the Crimea by delivering a swift blow on the Perekop isthmus, which carried them through the Ger. defences to Armiansk.

Fall of Kiev.—Though the Gers. might hope, by heavy counter-attacks, to stave off collapse at such vital points as Krivoi Rog and Gomel, the Russians held the initiative all along the line, for their blows fell now at one point and now at another, while the Gers., denied the use of strategic railways which were cut at vital centres, were unable to rush reserves to threatened places. It was in these circumstances that Kiev fell in the early days of Nov., and Jitomir (10 m. W. of Kiev) a week later, thereby cutting N. and S. rail communications and carrying the victorious armies of Gen. Vatutin within 60 m. of the pre-war Polish frontier; while at the same time heavy Russian blows were being struck at Krivoi Rog in the S. and in the Nevel region farther N. Kiev, the Ukrainian cap., was found to have suffered gravely, though the Russian advance had been planned to save as much of the city as possible from the Ger. demolition squads. When the Russians reached the high ground overlooking the one-time Russian cap., leaving behind them hundreds of wrecked Ger. guns and scores of tanks they saw the city a sea of flames. For one whole day a huge pall of smoke hung over the ruins, reflecting the glow. Russian guardsmen cut right across the city from the N., while Russian tanks set out at dawn, but only to plunge into smoky darkness when they reached the outskirts. One by one they found Kiev's proud monuments, churches, monasteries and modern buildings shattered. Nonetheless the liberation by Gen. Vatutin's troops of Kiev on Nov. 6 was the occasion for the greatest popular demonstration which Moscow had seen since its inhab. rose to meet the foe in the dread winter

of 1941. In the final two-day battle for Kiev the Gers. lost in killed 15,000 men and 6200 prisoners, together with 244 tanks, 174 field guns and 126 aircraft. It may be mentioned that Ger. losses in the four months since July 5 were 2,700,000 men killed, wounded, or captured. Of this number 900,000 were killed and nearly 100,000 taken prisoners. More than half the prisoners were wounded. In material they lost 9900 aircraft, 15,400 tanks destroyed or disabled and 2300 tanks captured, 19,800 guns, 75,000 machine guns and 19,000 trench mortars. But the Russian losses were also heavy, and moreover they were accentuated by the wrecked industries, especially in the Donetz Basin. Before retreating the Gers. had destroyed all furnaces, rolling mills and coke ovens. Winding machinery and cranes at the mines had been cut so thoroughly with oxy-acetylene lamps that repair was practically impossible.

General Vatutin's advance to Poland—Relief of Leningrad—German Eighth Army destroyed—Fall of Nikolai and Krivoi Rog.—The Russians were now on two fronts—Kiev and the Dnieper Bend; secondary fronts were Gomel and Vitebsk further N. Their method was to ring the changes upon these sectors, switching fresh power to one as the strength of the defence increased at another. Thus the Kiev offensive was begun after Ger. reserves had been concentrated at Krivoi Rog; while the Gomel offensive was intensified when the Gers. struck at Jitomir (Nov. 18) and at the same time the offensive was renewed in the Dnieper Bend. In their violent counter-attacks against the S. flank of the Russians' Kiev salient the Gers. were using their Fourth Panzer Army, the most powerful armoured force at their disposal in Russia and the force which under von Hoth had intervened in the battle of Stalingrad with such dire results for itself, since when it had been reinforced and assigned the task of extricating the Gers. from one difficult position after another. The Russians had just taken Korosten, the rail junction N. of Jitomir, and Rezhitsa, a centre of communications 20 m. W. of Gomel, when the Gers.' great counter-thrust to drive the Russians off the Kiev-Jitomir road was launched. The Russians fell back stubbornly, but, as indicated above, other Russian forces were soon creating a diversion, and, having reached the Beresina, were threatening Gomel (Nov. 23). Two Russian Ukrainian armies were also active in the 'Bend' in especially fierce fighting S. of Kremenchug. The industrial centre and rail junction of Gomel seized by Gen. Rokossovsky's armies (Nov. 26-27) in a bold by-passing manoeuvre. The initial attack to recapture the centre was deliberately begun in a region S. of Mogilev on account of its poor roads, which however had been remade under cover of rain and fog. This reconstruction enabled the Russians to develop a surprise attack on the Sorh R. and the result was the speedy collapse of the whole elaborate field system which had for over two years constituted Gomel one of the

most important Ger. bases on the central front. The next appreciable Russian success was the capture of Znamenka in the 'Bend' by Gen. Konev; while in the direction of Kirovograd, a most important position on the lower Dnieper about 20 m. W. of Znamenka, the Russians were exerting heavy pressure (Dec. 10-11). This fighting in the Bend was well timed, for in the Kiev salient the battles had reached a pitch of violence unsurpassed through the whole war and not unnaturally, in view of the German objective, which was to regain Kiev and restore their fortunes in S. Russia. But the Russian defences were deep enough to absorb the Ger. drive and, by the end of some three weeks, Gen. Vatutin, commander of the First Ukrainian armies, had now massed a great array of guns and anti-tank weapons for his counter-offensive. On two days alone (Dec. 10-11) his forces, in meeting the last furious Ger. assaults destroyed 200 Ger. tanks. The tide here began to turn in favour of the Russians about Dec. 18, when Vatutin was preparing to begin his massive counterblow against a foe whose tremendous losses in the past six weeks were beginning to tell; but the Russian general was careful to bide his time until the Ger. strength should be still further exhausted, especially as he would have to launch his offensive through lines in which the Russians were still fighting mainly on the defensive, and against a drive the power of which was still considerable. Meanwhile the Russians had begun a new offensive near Nevel in the N. and in a few days had broken through the Ger. fortified line on a front 50 m. long and penetrated to a depth of 20 m. Some 20,000 Gers. were killed here and 2000 taken prisoner, hundreds of places being freed in the region overrun (Dec. 15-20). The Ger. offensive in the Kiev salient collapsed towards the end of Dec. and now at length Vatutin struck back, advancing (Dec. 27) on a 50-mile wide front. After two months of anxious and prolonged battle a very powerful group of Ger. forces had gradually been brought to its knees—4 tank divs. were routed and 15,000 Gers. killed in two days—and Vatutin's recoil now bade fair to take his forces even beyond his farthest point westward the previous Oct. While these momentous events were happening in the Ukraine, the White Russian city of Vitebsk was being subjected to pressure from many points and S.W. of Zlobin in the Beresina basin the Gers. were being made to pay a high price for their efforts to recover the initiative in that region. Korosten was recaptured on Dec. 29 by Gen. Vatutin in his spectacular westward sweep, thereby giving him a junction of five railways. At the same time the battle for Vitebsk was nearing its climax, the fighting being especially dour, for here the Gers. were exceptionally strong in artillery and mortars. The following day Vatutin had retaken Korostyshev and his tanks were driving across open country towards the rail junction of Berdichev. Other Russian forces were pressing on from two directions on Jitomir and during

the fighting of Dec. 24-29 eight Ger. tank divs., including the S.S. Adolf Hitler and Reich Divs., and 14 infantry divs. were routed. Vatutin's counter-offensive had in less than a week recovered every important point won in seven weeks' bitter fighting by von Manstein's counter-attacks, with one exception, Jitomir, and that place fell on Dec. 31. By Jan. 2 Gen. Bagramian's troops were at the walls of Vitebsk, the number of Ger. dead found on the approaches being very great,

of Russia. Berdichev was taken on Jan. 5, 1945.

But the Ger. resistance in the 'Bend' remained as tenacious as ever despite Vatutin's success further N. It was evident that the Gers. realised the necessity of keeping the Russians from the Balkans at all costs; and the fact that Vatutin was nearing the Polish border was less alarming to the German Command than the Dnieper Bend battles owing to the large reserves they had in Poland, and



RUSSIAN ANTI-TANK RIFLE CREW

British-Soviet Society

the ravines that wrinkled the battlefield being piled with dead. With gathering impetus Vatutin's offensive was now sweeping forward on almost all sectors, von Manstein being out-manceuvred and suffering, not so much from lack of men, as from lack of mobility through the loss of strategic railways. Practically all the Ger. successes in Russia from the beginning of the war were achieved by seizing and exploiting the better lines of communication. Of that advantage it was the prin. object of Russian strategy in 1943 to deprive them; and by the end of the year the object was largely accomplished, the Gers. being left with very few of the excellent lateral railways by which they were previously so often enabled to switch reserves between the points at which major action developed. The important junction of Byelaya Tserkov, 40 m. S.W. of Kiev, was taken on Jan. 4 after four days of severe battle. In this battle troops of the First Czechoslovak Brigade took a successful part as allies

the difficult relations between Russia and Poland over the age-old question of their common frontier, a matter on which the Russians brooked no interference even by their W. allies. Meanwhile by a brilliant attack in the 'Bend' Gen. Ivan Konev seized Kirovograd. Not even the bridges had been destroyed, and the inhabs., whom the Gers. had begun to evacuate, were saved by Konev's troops. Big-scale tank and air fights marked the battle for this great stronghold—an eighteenth-century garrison tn. built originally to defend the Dnieper from attacks by Crimean Tartars and Poles. The Gers. counter-attacked frequently and with violence, but the Ger. commander of the garrison eventually seemed to lose control, and, by the final storming on a frosty moonlit night, when the Russians broke in from sev. sides at once, the Gers., realising the hopelessness of their position, had evacuated the tn., but only after leaving 15,000 of their dead in the area of the battle. Further N. Vatutin's First

Ukrainian Army had pushed on into Poland and was advancing on Rovno (Jan. 12). Southward of this front, the Russians were driving on Vinnitsa and the junction of Zhmerinka, on the main railway from Odessa to Warsaw. A well-planned outflanking move gave the Russian troops of Gen. Rokossovsky possession of Mozyr and Kalinkovichi the twin Ger. bases in the Pripet basin in White Russia (Jan. 13). These constituted the main enemy base on this front after the fall of Gomel and Rezhitsa, and the battle for their elimination revealed in the Russians a mastery of tactics and a skill in the co-ordination of all arms which they rarely themselves surpassed even in this war. Prodigious feats were accomplished by throwing light bridges over the marshes and laying timber 'corduroy' roads over the mud, with the result that their troops could take 76-mm. guns with them in a cross-country advance.

But great as were these victories in White Russia, the Russian High Command had been preparing a powerful blow much farther N., around Leningrad. Here they were aiming at the railway between the great city and Moscow, and now advanced to wipe out the salient which for so long had outflanked Leningrad and to a large extent nullified the advantage derived from the relief a year ago on the E. side following the reduction of Shlisselburg. The new offensive, under Gens. Govorov and Meretskov, was begun in the area of Oranienbaum and in the Volkhov region N. of Novgorod. This famous and, anct. tn. was taken by storm on Jan. 20, together with the fortresses of Krasnoye Selo, and Peterhof. Novgorod was regarded by some Gers. as being the key position of the whole of the E. front. One result of the Russian advance of the opening days through the most powerful defences was the capture of sev. great Ger. siege guns which, from a distance of 20 m. from Leningrad, had fired shells into the city over a very long period. A few days later Pushkin (formerly known as Tsarkoe Selo, later as Detskoe Selo or Children's Palace) and another historical tn., Pavlovsk, also fell to the troops of Govorov; while S.W. of Leningrad, the Russian advance overwhelmed the Ger. beachhead along the S. shore of the gulf of Finland—a stretch of 50 m. enabling ships of the Baltic fleet to sail once more and land supplies.

In the whole course of the Ger. withdrawal since the opening of the summer campaign of 1943 no large body of Ger. troops had ever been cut off, and it seemed well within the capacity of the Ger. generals, skilled in defence, to continue the movement without disaster until they could take up their positions on the 'Ost-wall' or fortified zone behind the Bug, which they regarded as impregnable. But the renewal of the Russian offensive S. of the Kiev salient and towards Kirovograd in Jan. increased the threat to some 10 Ger. divs. constituting the Eighth Army, based on Kanyev, S. of Kiev, the last Ger. foothold on the middle Dnieper. When the Gers. were thrust back on either side

of Kanyev, these 10 divs. were left in a 'pocket,' the 50 m. mouth of which was gradually sealed by convergent Russian movements from E. and W. Orthodox strategy should have made it obvious to Gen. Manstein that no practical purpose could be served by leaving these divs. at Kanyev, and it is probable that, but for Hitler's intervention, he would have sent relief forces much earlier to co-operate with the commander of the Eighth Army in a withdrawal. Thus the dangerous salient at Kanyev gradually became a fatal trap owing to Hitler's orders to hold out even at the price of annihilation. A five-day battle closed the gap. Gen. Vatutin, pressing from the Kiev salient and Gen. Konev advancing from Kirovograd, joined hands near Shpola, while the actual closing of the gap was effected by Gen. Rotmistrov, the tank leader of Stalingrad fame.

Meanwhile in the N., on Jan. 26, Gen. Govorod captured Krasnogvardeisk the railway junction S. of Leningrad, together with a long stretch of the Tosno-Narva railway and vast quantities of arms and ammunition. By the taking of Lyuban and other stations, the whole trunk line between Moscow and Leningrad was cleared of the enemy, except at Chudovo, where, however, the Ger. garrison was surrounded (Jan. 28). Chudovo soon fell to the Russians who were now advancing irresistibly on the great Ger. base of Luga, some 50 m. W. of Novgorod. On Feb. 1 the Russians took Kingisepp, 75 m. S.W. of Leningrad and within 10 m. of the Estonian frontier, the important junction on the line to Narva. Two Russian forces, 50 miles apart, were closing in on Luga, and the Gers., realising the danger of envelopment, threw in reserves into strong counter-attacks. They employed evasive tactics for some days and thereby escaped the threatened trap, but the withdrawal, besides costing them Luga (Feb. 13) was accomplished only at a great price in casualties and booty. Moreover they still had far to go before turning the corner of relative safety S. of Lake Peipus, where Pskov stood as a focal point of strongly fortified roads and railways. On Feb. 5 the Russians reached the mouth of the Narva riv. and the shores of Lake Peipus.

By Feb. 5 the remnants of the Ger. Eighth Army—which comprised as well as the 10 infantry divs., the S.S. Viking Panzer Div. recruited from 'quislings' in the 'Nordic' countries—had been driven into a still narrower area and lost control of all communications and all the tns. But the Gers. were still resisting on the banks of the Dnieper and Tysamin. It was evident that their position was hopeless ever since Gen. Konev, having taken Novocheerkassk, overcame the formidable natural defences of Smysla, due S. of that place, and since Col. Gen. Rotmistrov's tanks, veterans of the great battle with Manstein S. of Stalingrad, had fought their way to Shpola. A shattering blow at the remaining Ger. positions in the Dnieper Bend was struck when the Third Ukrainian army broke through the fortified defence lines N.E. of Krivoli Rog and N.E.

of Nikopol, routing 4 Ger. infantry divs. and 3 tank divs., besides capturing the rail junction Apostolovo, W. of Nikopol, and Marganets station, E. of that city. Through this victory the way of retreat to the W. was cut off for some five Ger. divs. in the Nikopol area. Meanwhile S. of Nikopol, Russian troops under Gen. Tolbukhin defeated seven Ger. divs. and broke through to the left bank of the Dniester throughout the whole length of the Ger. bridgehead on that riv. In the same series of battles in the Dnieper Bend the Third Ukrainian Army, co-operating with Tolbukhin's Fourth Ukrainian Army, routed the Ger. group in Nikopol and on Feb. 8 carried the town, with its celebrated manganese mines, by assault. On the field of battle in the Nikopol area the Gers. left 15,000 dead. The position of the Ger. Eighth Army had changed sharply for the worse by February 8, for all the good airfields were now in Russian hands, and air-borne supplies to the trapped divs. had become meagre, owing to the large number of Junkers transport planes shot down by the Russians. Seven Soviet spearheads of attack were now thrusting at the doomed army which was now compressed within an area of less than 250 sq. m. and with 90 m. of front to defend. Manstein's powerful efforts to bring relief had cost him 20,000 dead by Feb. 10, and the distance on that date between his forces and the Eighth Army had now increased to 21 m. The Ger. units at Kanyev were nearly all veterans of the Russian front, including the Viking Panzer Div., which latter had been badly mauled when Gen. Kleist had been hurled out of Rostov in 1941. The end came a week later after the fall of Korsun. An ultimatum was sent by Gen. Konev calling on the Gers. to surrender but, acting on Hitler's order to stand and die, they rejected the ultimatum. Gen. Konev therefore completed their annihilation. Some 52,000 Gers. were killed in the Kanyev trap or pocket and 11,000 were taken prisoner. The sequel to this victory was the capture on Feb. 22 of Krivoi Rog and the area of its iron mines, after heavy house-to-house fighting. Gen. Rotmistrov, the tank leader, was promoted Marshal of the Soviet Tank Forces by decree of the Presidium of the Supreme Soviet, in recognition of his part in trapping the Eighth Army. Russian official figures state that in six weeks' fighting on the whole front the Gers. lost at least 250,000 men killed and captured, besides 6000 guns, 1000 tanks and 600 aircraft. These figures included the four weeks' fighting on the Leningrad-Volkhov fronts, the Kanyev 'pocket' and capture of Nikopol and the break-through E. of that city; but were exclusive of the battles around Vitebsk, Staraya Russa (which highly important place had been evacuated by the Gers. about this time), Novo-Sokolniki, the Beresina and Pripiet rivs. and in Poland, all of which, on a conservative estimate, would double the foregoing figures of casualties.

The destruction of the Dnieper bend 'pocket' at Korsun removed a handicap

on the development of the Russian plans, which were necessarily directed to cutting the Odessa-Lviv railway, and released a large force for an advance towards the Bug. It was at this time that the victorious Gen. Vatutin fell ill (he died in April after an operation) and the fact that his place was taken by Marshal Zhukov, the defender of Moscow, emphasised the importance of this part of the front. Zhukov's dramatic intervention soon brought material results in a great breakthrough between Shepetovka and Tarnopol on a 100-m. front. This was a battle of heavy armour, in which between March 4-5 were defeated 4 Ger. tank divs. and 8 divs. of infantry under Manstein. It might seem that the Gers. were taken by surprise, but, although the front W. of Luck had been quiescent for the past month, it could always be assumed that the Russians would neglect no reasonable opportunity of striking a heavy blow in a region in which the enemy line ran parallel to the most important strategic railway in S. Russia—the railway between Odessa and Lwow. For the railway was the mainstay of communications between the Ger. armies on the whole of the S. front and their bases and, on its retention, depended their ultimate chance, in case of a general retreat, of keeping in touch with the armies in the N. Manstein, compelled to fight on a line parallel to his communications, had long occupied one of the classic positions of strategic disaster. Before the Ger. invasion of 1941 the railway was a double line of 500 m. and the Gers. had since converted the gauge and doubled the track, so as to carry not only supplies to their armies of the Don and Dnieper, but the mineral traffic back to Germany from Nikopol and Krivoi Rog. Manstein had now lost control of it, for the line was cut by the loss of Volochisk and he had become dependent on single-line tracks across the Dniester towards Rumania and far removed from the Ger. armies of the central group. Zhukov's offensive, which cost the Gers. some 15,000 killed and 3000 prisoners between March 4-6, threatened to force Manstein back against the Carpathians and the Rumanian frontier—a threat implicit in all the Russian advances made in the winter along the middle Dnieper. This new blow brought the threat much nearer realisation. Yet the Gers. appeared to face the prospect of isolation with equanimity, for their forces in the Dnieper bend had continued their retreat without undue haste and indeed showed no sign of pulling out altogether from S. Russia. Meanwhile farther N. the Russians captured Staraya Russa, S. of Lake Ilmen (Feb. 18) and, with the seizure of Rogachev, Dno and Vitebsk on the route to Pskov a week later, were threatening the Ger. lines of retreat in White Russia. The Russians broke into Tarnopol on March 9 but the Ger. resistance there, at Proskurov and at Vinnitsa had greatly strengthened.

The Gers. were, however, allowed no respite, for the armies under Marshal Konev (Second Ukrainian Front) in their turn

resumed the offensive further S. and also broke through on a 100-mile front, crossing the Bug and taking Uman and Kristinivka, and heavily defeating 14 Ger. divs. (March 5-10). Marshal Rotmistrov's armoured forces were first to cross the Bug, and in the battle more than 2000 tanks were engaged—a big tank battle even for this war. Then, soon afterwards, forces of the Third Ukrainian army under Gen. Malinovsky, having forced the Dnieper, stormed the tn. of Kherson (March 13), which then constituted a powerful base of resistance at the mouth of the riv. The garrison of Kherson were completely outmanoeuvred and once again the unorthodox Russian strategy had dislocated Ger. fixed plans and proved that the Russian soldiers could rise superior to any conditions of weather and terrain baffling to most other troops. Marshal Konev, having broken through on the Bug front, was now pressing without pause towards the Dniester valley and Bessarabia. By March 20 his troops were across the Dniester, having forced the riv. on a stretch of 30 m. and captured the Moldavian tn. of Soroka. The rapidity of his advance is shown by the fact that, on reaching Ryshkanovka (Rascani) he had advanced 200 miles from the positions on the Dnieper where only seven weeks previously his guns were firing on the Ger. positions at Kan-yev. He was, moreover, in Moldavian ter., ter. which had been in Rumanian possession only in the uneasy period between the wars, a fact which ensured the sympathy of the people for the advancing Russians. In the course of this great advance, there was evidence of Germany's dwindling strength in equipment. From motor-vehicles the Gers. had been reduced to peasant carts, and it was a common sight in the wake of their retreat to see abandoned wagons containing wounded men and men dead from neglect; while bridges were either intact or were being rapidly repaired by the inhabs. for the Red Army. Women offered to tend the Russian wounded, and feasts of local dishes and sharp-flavoured Moldavian wine were offered to the soldiers. The fall of Zhmerinka and the isolation of the great hedgehog stronghold of Vinnitsa removed the danger of a Ger. counter-thrust against Russian units advancing on Mogilev-Podolski. Both the latter and Vinnitsa fell to the Russians soon afterwards.

Meanwhile for the past fortnight Manstein had been making strenuous counter-attacks in the Tarnopol-Proskurov region, hoping at least to retain the railway between the two tns. These attacks were well supported with fresh divs. drawn from the reserve, but, though the numbers of these divs. were far short of those employed months ago against the Kiev salient, the battles took a similar course, with Russian anti-tank and field artillery densely massed and infantry entrenched on the line of the Ger. counter-advance. Gradually, however, but more quickly than hitherto, the Gers. were bled white, and then suddenly Zhukov struck again

on a wide front on sev. sectors at once, broke through the Ger. defences in the Tarnopol-Proskurov region and swept forward from 40 to 60 m., forcing the R. Pruth and closing in on Kamenets-Podolsk and Proskurov. In these battles the Gers. left up to 20,000 men killed and more than 3500 prisoners, besides 300 tanks and much other war material.

It might be said that all roads in S. Russia led to Plocsti. That was the prize for which the Russians were driving across the rivs. of the Ukraine and Bessarabia. It seems incredible that Manstein planned to abandon not only the Bug but also the Dniester riv. barriers without a struggle and in circumstances that opened the way for a vast turning movement at the expense of his forces still fighting on the lower Bug. But so it seemed. The line of the middle Dniester caved in suddenly, but that of the lower Bug, far to the S.E., held firm. Yet if the Dniester positions were not restored, those on the Bug could not be maintained and Odessa would fall to the Russians and the road into Rumania would be opened by way of the coastal plain.

This, in fact, is precisely what happened. Before the end of March Konev's troops, having crossed the Dniester on a front of 110 m. reached the Pruth for 50 m. of its course. Other forces occupied Proskurov and surrounded the Ger. garrisons of Tarnopol and Kamenets-Podolsk, both extremely powerfully fortified. Kamenets-Podolsk, centre of Ger. resistance N. of the Dniester, was stormed by Zhukov's tanks and infantry, thus cutting the only railway left for the retreat of the Gers. in the Proskurov area. At the same time Malinovsky's forces captured Nikolaiev, the Black Sea port on the mouth of the lower Bug—the last tn. held by the Gers. on the l. b. of the riv. This rapid success was due partly to the catastrophe suffered by the Gers. between the Ingulets and Ingul, in which the Gers. lost the major proportion of the forces intended for the defence of the Black Sea coast, though they still retained considerable strength in artillery and tanks for the Nikolaiev garrison. The Russians soon forced the Pruth, and by the last day of March Zhukov took Kolomea, 45 m. N.W. of Cernauti. Cernauti fell the next day. Zhukov's and Konev's forces had now joined hands, and all three Ukrainian armies, were moving simultaneously. Ochakov fell in a sea and land attack to Malinovsky on March 31. Announcing on April 2 that Russian troops had entered Rumanian ter. (as distinct from Bessarabia or ter. claimed to be really Russian) Molotov, foreign commissar, stated that Russia had no wish to acquire new ter. and that the Red Army's object was to pursue the Ger. and satellite armies until their final rout and capitulation. Rapid progress was now being made towards the capture of Odessa and, meanwhile, some 15 Ger. divs. in the Skala region, S.E. of Tarnopol, were surrounded and gradually wiped out. The Russians claimed that between March 4-31 the Ger. losses on the First Ukrainian front (Zhukov) included

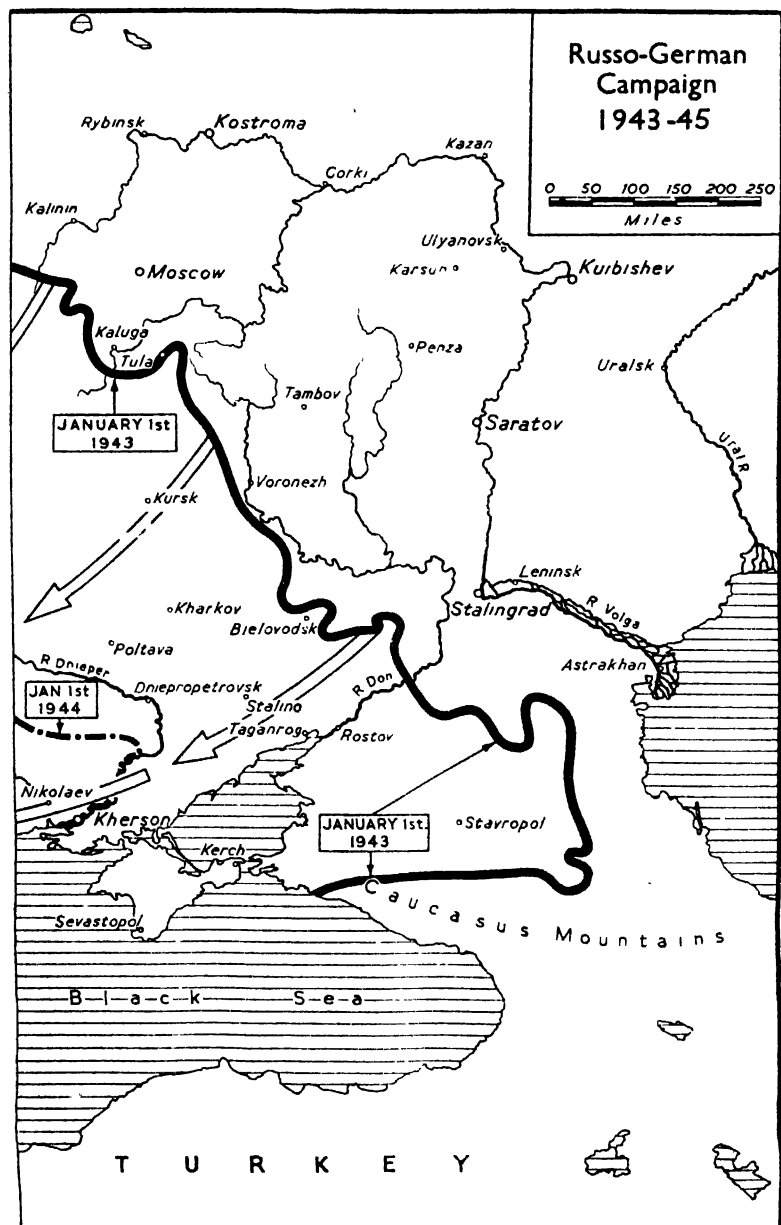
183,000 dead and 25,000 prisoners besides the destruction of 1330 tanks and 22,500 armoured cars. On April 5 Malinovsky brought Odessa's fall nearer by cutting the main route of retreat to Rumania at Razjelnaya junction. In close co-ordination the armies of Zhukov and Konev drove the enemy from Bukovina and took up positions on a 180-mile front from the Yablonica Pass in the Carpathians to a point on the Sereth 50 m. N.W. of Jassy. Thus the Russians had now reached the borders of Czechoslovakia, and among their forces was a strong Czechoslovak brigade under General Svoboda. On April 10 Odessa fell to Malinovsky in a frontal attack combined with a flanking movement. The great Black Sea port had been in Ger. hands since Oct. 16, 1941. On the same day Tolbukhin's Fourth Ukrainian army launched a new offensive against the Crimea from the isthmus of Perekop while Gen. Eremenko's Independent Maritime Army was advancing eastward from the Kerch peninsula. On April 13 Malinovsky took the strongly defended fn. of Tiraspol, 60 m. N.W. of Odessa. The Gers. were now in full flight before the armies of Tolbukhin and Eremenko. The feature of this campaign for the retaking of the Crimea was the rapidity with which the Russians overran the peninsula. The successful operations in the Kerch region under Eremenko were a development of the landings made the previous winter N.E. of Kerch port. Russian marines had then struck inland from the Kerch straits, and gradually forces were accumulated on the beach-head for this general assault. On April 13 Eremenko captured Feodosia on the Black Sea while Tolbukhin took Eupatoria, and then Simferopol, cap. of the Crimea and main base of Ger. resistance covering the ways to the harbours on the S. shores of the Crimea. Tolbukhin then struck straight through the mountains S. of Simferopol to the coast and soon both his and Eremenko's forces were closing on Sevastopol, thousands of prisoners being taken and great havoc wrought by aircraft and ships on the enemy in his vain efforts to stage a 'Dunkirk' evacuation. Stormoviks swept up and down Sevastopol bay and in and out of Balaklava bay and the bays on the W. and S. shores—places which to innumerable Russians recalled holiday memories. But the main object of this whirlwind Russian campaign was not so much the recapture of ter. as the destruction of the enemy divs. rashly left behind by Manstein for the defence of the Crimea. For it was in this aspect that the campaign was most calculated to help the operations in Rumania, where von Kleist was in difficulties over getting sufficient trained units, and where the effect of a possible Ger. failure to defend Rumania might have important political repercussions.

Eremenko captured the port of Yalta, 30 m. from Sevastopol, on April 16 and the battle was now restricted to a struggle for Sevastopol and the Khersones headland. Meanwhile the lower Dniester was forced at many points in the direction of

Kishinev. Bombers of the Red Air Force made a heavy attack on the railway junction of Galatz (April 17). Allied bombers, based on It. airfields, were also attacking places in Rumania and Bulgaria. But it was essential to get Sevastopol and so free the armies of Tolbukhin and Eremenko. Step by step Eremenko's troops were now fighting their way along the winding, overhanging roads leading to the S. exposed side of Sevastopol, and on April 18 they entered Balaklava. The Black Sea fleet also took a hand in the operations by shelling Sevastopol and the neighbouring coast. Tolbukhin's troops had now pushed right up to the city along the railway from Simferopol and captured the heights of Mekenzia, which command a good view of the city and all its fortifications. But advancing along the two chief roads crossing the plateau S.E. of the city Eremenko's troops approaching the port were most exposed. It was ground which the Russian garrison had bitterly contested until the last two days before the city had fallen to the Gers. in 1942. By the 19th the Russians, breaking through precipitous rocks, reached the aqueduct S. of the city, thus completing the arc round its landward sides and bringing the whole city and port under their artillery fire. Hundreds of Ger. and Rumanian troops, driven to the edge of the Crimea near the port, were forced into the sea from the high cliffs above Balaklava. Others trying to get away in high-powered barges from the beaches further S., were drowned in their efforts to escape.

Fall of Sevastopol—German débâcle in the Crimea.—In twenty-nine days the whole Crimean campaign was at an end and the Gers. and Rumanians driven out of the peninsula. Nothing in the Russian advance of 1943-44 was more eloquent of the skill, determination and patriotism of the Russian commanders and their men than this remarkable campaign in which Sevastopol, which earlier in the war the Russians had defended for two hundred and fifty days, fell to Tolbukhin's forces within a week from the moment when the Russians, on May 6, began their attack on the Belbek line. The loss of the Crimea and the destruction of a force of 200,000 men was a Ger. disaster almost as great as that of Stalingrad. The Ger. intention was to hold Sevastopol for a considerable time, with picked Ger. troops, aided by Rumanians under Gen. Jaenecke. Originally Tolbukhin had decided to try to take Sevastopol in his stride, avoiding the error of Raglan in 1854 and Manstein in 1941, when they allowed themselves to be drawn into accepting the burden of a siege. But the unexpected Ger. decision to resist at all costs, coupled with the difficult terrain held up the Russians at the toughest of all the Sevastopol outer defences, which ran from the W. coast along the Belbek riv., over the Mekenzia heights, then E. of Inkerman and along the 5-mile Sapun Ridge to the mts. E. of Balaklava defences which must be taken in any landward attack irrespective of the





introduction of new weapons or modes of warfare. By this time Jaenecke, the Rumanian commander, had been replaced by a Ger., Gen. Almendinger, who announced that Hitler had ordered him to hold Sevastopol at all costs. The Ger. commander had at his disposal some 50,000 men, mostly Gers.; for the Rumanians had either surrendered or been shipped away. The Russians skillfully exploited deceptive tactics. Knowing that the enemy was nervous about the defence of the N. shore of Sevastopol Bay, because its loss would involve that of the railway to Inkerman on the sidings of which lay the bulk of their equipment, Tolbukhin disposed large forces opposite the Belbek line and delivered so formidable a diversionary attack that the Ger. commander was compelled to move northward part of the forces which were stationed on the all-important Sapun Ridge W. of the Inkerman valley, and it was on this powerfully-fortified ridge that the decisive battle was to be fought. Simultaneously the Russians also delivered sharp attacks in the Balaklava area. Then, on May 6, the Russian infantry, following a devastating artillery and mortar barrage combined with Stormovik bombing, opened their general attack. They crossed the paved road between Inkerman and Balaklava, stormed the grim heights, and reached the summit, albeit with unquestionably heavy losses. The breach was decisive. Threatened with being trapped on the N. side of the bay, the Gers. had to withdraw across the Belbek, over the Mekenzia heights and along the S. shore to Sevastopol and beyond. Over fields where the Light Brigade had staged their historic charge Ger. forces were driven from a large Soviet State farm westward. Then Hitler reversed his order and promised to send ships to evacuate the entire force. But now from S. and E. storm detachments of Stalingrad veterans broke into Sevastopol (May 9), while from the N. shore other forces crossed the bay into the city.

Russian offensives in Finland and White Russia—Fall of Minsk and Vilna.—While the Anglo-Amer. forces were invading Normandy in 1944 and advancing northwards in Italy, Stalin was preparing new and decisive blows against the Gers. on the E. front. He began with an attack on the Karelian Isthmus, Finland, in mid-June, to remove the persistent menace to the N. flank of the Russian front. In a week the Mannerheim Line was broken. In June 1944 Marshal Govorov concentrated the weight of his onslaught on the W., thereby avoiding the natural water obstacles along the E. half of the Mannerheim Line, and very soon he had captured Viipuri, where the enemy's chief lateral line of railway met the coast.

A few days later the Soviet armies began a great enveloping movement against the Ger. divs. concentrated in the fortified zone of Vitebsk and, on June 26, after forcing the W. Dvina, they carried by assault the tn. of Vitebsk, an important regional centre. This proved to be the

opening gambit of a Russian attack on a massive scale which was soon destined to have deep repercussions. Already the attack extended from N. of Vitebsk to Zhlobin, a front of 200 m. Along this impressive front from the Karelian Isthmus to the Pripet the order of battle was: Leningrad front (Marshal Govorov); Second Baltic front (Gen. Eromenko); First Baltic front (Gen. Bagramyan); Third White Russian front (Col.-Gen. Chernyakhovsky); Second White Russian front (Col.-Gen. Zakharov) and First White Russian front (Gen. Rokossovsky)—in all six great army groups, not counting that of Meretskov. The importance of Vitebsk was strategic, for it lay between the Russian army groups on the borders of the Baltic States and in White Russia and, after the fall of Nevel, it became the northernmost fortress in the Ger. line defending White Russia, while at the same time it served as an outpost of their Baltic defences. Bobruisk, an important centre of communications and a powerful stronghold covering the approaches to Minsk and Baranovich, was captured on June 29 by Rokossovsky, who was then promoted to the rank of Marshal. This strategic victory, coupled with the forcing of the Beresina river, was of historic importance in Russian eyes in that it provided a parallel with the defeat of Napoleon's army on the Beresina in 1812. Certainly Rokossovsky's blow was a decisive one, for it doomed the Ger. defence at the White Russian cap. of Minsk, besides costing the enemy 16,000 dead and nearly 20,000 prisoners. Indeed, in the six-day offensive by Rokossovsky's armies, culminating in the victory of Bobruisk, the Ger. losses were 50,000 dead and nearly 24,000 prisoners; while on the White Russian fronts as a whole the Ger. dead now numbered 80,000. At the same time Mogilev, an important stronghold due E. of Minsk, on the Dnieper, fell to Gen. Zakharov; while, in the N. Petrozavodsk, cap. of the Finnish-Karelian republic, was occupied by troops of Govorov's command.

Minsk, the great bastion of the German front N. of the Pripet, was captured by the forces of Gen. Chernyakhovsky (promoted June 27) and Marshal Rokossovsky on July 3; while, farther N. still, the Russians had fought their way into Polotsk, pivot of the Ger. positions defending the Baltic coast. On the eve of the Russian liberation of Minsk, when the guns of the approaching Red Army were audible and the Gers. began hurriedly to make plans to leave, the citizens of Minsk rose to arms. It was a spontaneous rising of the people, under leaders unknown. One group attacked the Ger. arsenal, seized it and distributed arms, and violent fighting was in progress in the streets when Russian tanks reached the N.E. outskirts of the city on the morning of July 4.

The swift Russian advance westward threatened the important railway junction of Vilna, the loss of which would disrupt the Ger. Baltic and central fronts and lay E. Prussia, the traditional if mythical home of Prussian militarism,

open to attack by the triumphant Soviet armies. Meanwhile the Red Army was completing the destruction of the Ger. forces trapped E. of Minsk, who now paid a heavy toll in their efforts to escape. Farther S., Kovel fell to the Red Army on July 6. This was an important Ger. bastion to the S.E. of Brest Litovsk; and the Soviet armies' offensive, which was now aimed at positions vital for the Gers. over a front extending from S.E. of Dvinsk to W. of Kovel, was being carried on with the greatest vigour over dusty roads in hot July sunshine. Molodechno, Baranovich, and Lida were the next important positions to fall to the Russians who brushed aside all attempts to delay their onrush with minefields or other obstructions. On July 13 Vilna fell to the Red Army, nearly 10,000 Gers. being killed and thousands more taken prisoner. On the next day the capture of Pinsk and of Volkovysk (two outposts of the Ger. line covering Warsaw) increased the Red Army's threat to the strategic junctions of Bialystok and Brest Litovsk. Farther N. the strongly defended Ger. base of Grodno was in process of being outflanked. Between Dvinsk and Vilna two Russian groups had now joined hands and 25 m. W. of Vilna were marching on Kaunas, which, with Grodno, formed the other great bastion defending the E. border of E. Prussia.

Marshal Konev's advance into Poland.—Fall of Pskov.—In three days' fighting (July 16-18) troops of the First Ukrainian Front led by Marshal Konev—who had assumed command in place of Marshal Zhukov—broke through the Ger. defences E. of Lwów on a 120 m. front and advanced 30 m. Among numerous tns. captured were the large railway junctions of Krasnoye and Brody. Konev outwitted his adversary by opening his great offensive without the usual artillery support. His vanguards overran the enemy positions, and only when they were firmly lodged in the Ger. lines did the Russian guns open up and their aircraft go in. Konev's object was to outflank the important Brody gap and this he achieved by attacking at Zolochov, 20 m. S.W. of Brody and then thrusting N.W. to Krasnoye. Further on July 18 Russian troops N. and S. of Alytus fought for the expansion of their bridgehead on the W. bank of the Niemen. Blows now fell thick and fast along the E. front generally. On the 19th the forces of Gen. Eremenko and of Gen. Bagration broke through strong defences on a 43 m. front towards the Latvian border S. of Ostrov and, towards Dvinsk, penetrated 5 m. inside the border. Further S. Konev's forces in the advance on Lwów completed the encirclement of a large enemy group W. of Brody. In yet another new offensive next day, from Kovel, they made a 90 m. breach in the Ger. defences, and in two days swept forward 30 m. to the W. Bug riv. The Gers. were now in precipitate retreat from long-cherished positions designed to protect the roads to the Baltic, to Warsaw, and to Germany itself. Pskov, the stubborn N. barrier to the Baltic republics,

was taken on July 23, two days after the fall of Ostrov. Pskov, the venerable Russian city near Lake Peipus, had been rendered untenable as the result of the collapse of the enemy line here under the series of blows dealt by Gens. Eremenko and Maslennikov. Its fall marked the liberation of the last city of the Russian Republic from the Ger. invader. (See also Pskov.) July 22-23 saw, indeed, the most remarkable advance of the war, a veritable Russian tidal wave on an immense frontage. All along it tn.-strongholds of the first importance—Dvinsk, Kaunas, Bialystok, Brest Litovsk and Lwów—were now in the utmost peril. The famous fortress of Przemysl, which had figured conspicuously in the First World War, was now coming within striking distance with the advance of the Russians to the San. S.W. of Brody, Konev's strategy had its reward, for here the Russians rounded up the trapped Ger. forces, more than 15,000 being taken prisoner. N.W. of Chelm (Kholm) the Soviet troops retook hundreds of places and broke through into the large tn. of Lublin, where thousands of Jews had been murdered by the Gers. Still further S. and to the W. of Tarnopol, numerous other places were taken. In fact the front was surging forward along virtually its entire length. In the N. the situation was most dramatic, for here, in Estonia, there was every chance of isolating the Ger. divs. under Gen. Lindemann. The Gers. had been holding the line from Lake Peipus to Dvinsk with the greatest obstinacy, knowing that if they lost their hold on the lake their strongly-defended front to the N. of it would become useless. But now, with the loss of Pskov, it looked as though their link with Lake Peipus would soon be snapped, and, if that happened, the Russians could push on towards Riga.

Russians take Przemysl, Brest Litovsk, Bialystok, and Kaunas.—By taking Siauliai (Shavli), the key junction in Lithuania, the Russians cut the main link between the Ger. armies in Estonia and Latvia and East Prussia (July 27, 1944). Dvinsk and Rzekane in Latvia, and Lwów and Stanislawow in Poland were occupied, while at the same time the bridgehead across the San was widened, thus sealing the fate of Przemysl. The next day three more of the remaining Ger. strongholds fell—Przemysl, Yaroslav and Brest Litovsk—a succession of victories which ran like a portent across the darkening sky of Hitler's hopes. In these days of a rapidly-changing front the Ger. High Command was outwitted by the unorthodoxy of Russian strategy. The Ger. generals, unable to be uniformly strong all along the line, especially with dwindling reserves, left those parts of the front more thinly guarded which might seem, from the Russian standpoint, to be unsuitable and costly for large-scale offensives; but it was precisely at these points that the Russians launched their main attacks—at Przemysl, Lublin and westward in a direct line for Warsaw. Earlier the Gers. had given signs that the

Vistula-San line would constitute their main defence barrier upon which they might fall back slowly and in good order if they failed to check the Russians by 'elastic' methods farther E. But hardly had these dispositions been planned by the Gers. when their general situation began to deteriorate in Poland at a more accelerated tempo than ever; for the fate of their great bastions at Brest Litovsk and Bialystok became sealed by swift and irresistible flank advances. Impressive as were the victories at Dvinsk and Pskov at one end of the front and of Lwów at the other, nothing was so spectacular as the tremendous Russian surge into the middle of the Polish plains. This left the Gers. no alternative but to hold Brest Litovsk and Bialystok long after they had been by-passed—especially the former, which, at its downfall, was over 50 m. in the rear of the flanking Russian spearheads. The loss of the Ger. garrison (about 20,000 men) at Brest Litovsk was forced on the Ger. Command by the necessity of engaging as many Russian troops as possible to check the drive on Warsaw and to give the Gers. time to strengthen their defences in front of the Polish cap. and on the Vistula. In the Baltic States Gen. Bagramyan's advance into central Lithuania foiled the Ger. plan to form a strong line on the Dvina and thereby keep open the road for Germany's Baltic armies into E. Prussia. Protecting Bagramyan's right flank was the army of Gen. Eremenko, who captured Jelgava (Mitau), the main communication centre between the Baltic area and E. Prussia. Farther N. other Russian forces crossed the Estonian border and advanced along the Pskov-Riga road and the Valka railway. Kaunas (Kovno), into which very important stronghold Russian troops had broken on July 31, was at length carried by storm on Aug. 2. The Russians were now massing forces on the Vistula and Niemen for the invasion of E. Prussia and, possibly, of Cracow. Meanwhile Rokossovsky's troops were heading N.W. to Warsaw and there was protracted fighting on the outskirts of Praga, the dist. of Warsaw which stands on the r. b. of the Vistula. Very heavy fighting now threatened on the E. front generally. For the prizes at stake were great: two trapped Ger. armies in the Baltic; the 'sacred soil' of E. Prussia; Warsaw, Cracow and Silesia; and the Carpathian passes. The Gers. would not yield any of these without a desperate struggle and they had reinforced all the fronts except in the area S. of Lwów. In this area Sambar, the last Ger.-occupied centre of any importance in the W. Ukraine, fell at this time to Marshal Konev. Drohobycz, the oil centre, was captured by Col.-Gen. Petrov, defender of Sevastopol and victor of Taman, who was now placed in command of forces operating in the Carpathian foothills. In the N. Ger. resistance stiffened considerably on the approaches to Velga, the Gers. here providing powerful air support to their troops defending the Tallinn-Riga railway—an indication, in the desperate condition of

the Luftwaffe, of the importance they attached to the railway. Equally stiff was their resistance W. of Siauliai, around Warsaw, where the partisans were fighting bitterly against the Gers.—and at Sandomierz, S. of Lublin, and at other Russian bridgeheads on the Vistula. Three Ger. divs. surrounded near Sandomierz were destroyed by Aug. 19.

The Battle for Warsaw—Armistice with Finland.—Russian offensives in the Baltic States.—But thereafter came a check to the Russian attacks before Warsaw, against East Prussia, and in the Baltic States. The situation in Warsaw itself was obscure. Relying, apparently, on the approach of the Russian forces, the patriots rose against the Gers. and were soon in possession of many key-points. They were commanded by Gen. Thaidem Bor-Komorowski, known as Gen. Bor, whose appointment to the command of the Polish underground forces was confirmed by Gen. Sikorski a few hrs. before the latter's death. But at this junction the Gers. strongly reinforced their E. front with a great accession of armour, and the attacking Russian forces received a severe set-back. In Latvia, so far from cutting off the isolated Ger. divs. the Russians were themselves held in check for weeks in the Mitau area nor did their troops, for some time, make any appreciable progress from Lake Peipus into Estonia, though they took Tartu on Aug. 25. Riga, too, seemed as unassailable as ever. Nor was any further progress made or perhaps yet intended against E. Prussia on the borders of which the Ger. citizens were driven *en masse* to dig trenches.

In the third week of Aug. a violent battle of armour was raging on the approaches to Warsaw. It extended over the flat ground between the Vistula and the last few m. of the course of the Bug and across the Warsaw-Bialystok railway. The battle was one of sustained violence, the Gers. abating nothing in their efforts to blunt the power of Marshal Rokossovsky's armour. Ger. tanks in groups of 100 strong returned ten times a day to the attack, supported by sev. regiments of infantry. Meanwhile, however, the plight of the Poles in Warsaw was daily growing more desperate. Allied armmen dropped light weapons for their use, but the Russians refused the use of air fields E. of Warsaw to facilitate and increase their supplies. The Russian Command contended that the rising in Warsaw was premature and contrary to their orders; but it is possible that the political conflict between the Polish gov. in London and the Polish Liberation Committee formed in Russia had its influence on the position (*see further under POLAND*). But at the time of the heavy Ger. counter-stroke in July when Rokossovsky had all but entered Praga after an advance of 300 m. behind the Russian marshal were 350 m. of demolished railway track. Stalin therefore made up his mind to suspend action in the Polish salient until the railways behind his armies could be repaired and altered to broad gauge in readi-

ness for a winter campaign. By Sept. 3 troops of Gen. Bor's Home Army in Warsaw had been forced to surrender some of their positions in the Old Town, where half the pop. of about 100,000 had been killed or wounded and where not a single house was undamaged. In other parts of the battered city the Gers. were continuing periodical air, artillery and mine-thrower attacks.

At this date Finland dropped out of the war, an armistice being arranged between that country and Russia on the morning of Sept. 4. The armistice was not actually signed until Sept. 19 when the Finnish delegation reached Moscow. Under its terms Finland lost both Karelia and the Petsamo area—which latter was still held by the Gers.

Meanwhile things were going ill with the insurgents in Warsaw under Gen. Bor. The Russians, however, had captured part of Praga, after some six weeks of battle unmatched in violence or in scale since the beginning of the summer campaign, extending from near the confluence of the Bug and the Narew to the Vistula. But Warsaw as yet was far from falling to the Russians, and on Oct. 3 the Polish underground army gave up the struggle. For sixty-three days they had fought fanatically in an effort to wrest their city from the Ger. leader, but at the end of that time their supplies had become exhausted and both garrison and people were completely starved out. Their casualties numbered over 150,000. Half the city was destroyed beyond repair and an additional third so badly shelled that remnants of structures still standing would have to be razed and rebuilt. But their defence will remain for ever a testimony to the moral strength of the Polish people and their passionate will to an independent life.

According to Gen. Bor's disclosures in 1918 the Soviet armies for sixty days passively watched the destruction of Warsaw and the massacre of its Polish defenders and inhabitants. The prin. difficulty which faced the Polish Home Army of Gen. Bor was that Russia had broken off diplomatic relations with Poland early in 1943 and efforts by Mr. Anthony Eden, as mediator, to re-establish relations in view of the Red Army's approach to the Polish frontier, were unsuccessful because the Soviet Gov. would only discuss renewal with a Polish Gov. 'favourably disposed' towards the Soviet Union and Molotov's reply to Mr. Eden was that neither the Polish Gov. in London nor the Polish commander-in-chief, Gen. Sosnkowski, fulfilled that condition. To justify this attitude Molotov charged the Polish Home Army with 'inactivity' towards the Gers., a charge which was repeated by Stalin at Tehran in President Roosevelt's and Mr. Churchill's presence. In these circumstances the Home Army had only two alternatives—either to suspend all operations until such time as diplomatic relations were restored or to continue to fight the Gers. regardless of Russia's attitude. In that critical hour a difference of opinion arose in London between Gen.

Sosnkowski and Premier Mikolajczyk: the former thought the resumption of relations should be a condition of any further operations on the part of the Home Army, the latter that there was a possibility of compromise with Russia and that the only way to counteract Russia's allegations was to convince them by action. That point of view prevailed with the Home Army, though Bor himself had no delusions about the aims of Soviet policy ever since the occupation of Poland's E. ters. in 1939-41 as the result of the Ribbentrop-Molotov pact. Bor also averred that the Home Army still believed in the unquestioning support of the W. Powers, not realising to what extent the Russian point of view had been accepted. But when, in the autumn of 1943, the Red Army eventually entered Polish ter., Bor again issued an order to all units to avoid friction with the Russians and to do everything to facilitate the Russian advance. On Aug. 1 the city rose against the Gers., not only the date but the precise hour for so doing having been given to the Russians by Mikolajczyk, who was then in Moscow, and the Russian staff was officially notified by the Brit. staff. The real Russian attitude to the Warsaw rising was that of distrust and hatred for the Polish resistance movement, notwithstanding all the tactical advantages which the Red Army derived from its existence and forlorn struggle. Within three days, however, the greater part of the city fell into Bor's hands and the Gers. retained only a few strongholds which they continued to defend in the hope of relief. Then suddenly the Soviet artillery became silent and the Soviet Air Force disappeared from the skies. The Soviet radio, which had continually urged the Polish people to rise and free their capital, became suddenly mute. All Bor's efforts to establish liaison with the Soviet High Command, either directly or through London, were unsuccessful. After that the rising gradually collapsed and inch by inch the Gers. recovered their lost ground. Capitulation followed inevitably, the Polish losses being more than 15,000 soldiers in addition to thousands of civilian losses, which were estimated by Ger. propaganda sources at 200,000.

On the so-called Leningrad Front, in mid-Oct., the Soviet armies began a new offensive in the Baltic states, from 70 m. E. of Tallinn, the Estonian cap., to the outskirts of Riga, the Latvian cap., a distance of 200 m. Tallinn fell to Marshal Góvórov on Sept. 23, the Gers. thus losing an important naval base and port in the Baltic. The Gers. were now fighting hard to stave off disaster in Latvia which threatened from the combined operations of Marshal Góvórov and Gens. Bagration and Maslennikov. All Estonia was now in Russian hands except for the is. of Dagó and Oesel. The Gers. held a strongly-fortified defence zone between the gulf of Riga and the Dvina riv., but by Oct. 5 the Red Army had carried the first line of the Ger. fortifications round Riga. A powerful Russian attack in Lithuania

N.W. and S.W. of Shavli broke through the strongly-fortified enemy defences, and in 4 days fighting the Russians advanced in spectacular manner up to a distance of 82 m., widening the breach in the Ger. front to 175 m. This new Russian offensive under Gens. Bagramyan and Maslennikov, the essential preliminary to an advance on to Ger. soil, was aimed at the destruction of the powerful Ger. groups that had hung menacingly over Gen. Cherniakhovsky's right flank for sev. months and thereby checked that Russian general's advance on the E. Prussian border.

New Russian attacks in Rumania—Armistice with Rumania.—First attack on East Prussia.—Russian invasion of Hungary. — Budapest encircled.—Russian troops under Marshals Malinovsky and Tolbukhin launched new offensives in Rumania late in Aug. with a view to the capture of the all-important Ploesti oilfields and the elimination of both Rumania and Bulgaria from the war. Kishinev in Bessarabia soon fell. Jassy was taken in three days fighting, together with numerous smaller places. At this point (Aug. 23) Rumania sought an armistice which, with the approval of Great Britain and the U.S.A., was granted by the Soviet Union. It now remained for the Russian generals to expel the Gers. and their satellite troops. The Russian advance soon gathered fresh impetus, especially after Malinovsky's troops had broken through the Galatz gap and captured Galatz, Braila fell on Aug. 23, Focsani and Buzau soon afterwards, and the victorious Soviet forces were closing in on Ploesti. This famous oil centre fell on Aug. 30 after a remarkably rapid advance by Malinovsky's troops, while a few hours previously the port of Constantza was captured by Tolbukhin. On Aug. 31 Ger. troops in the Ploesti area were routed and the Russians entered Bucharest. Advancing up the Danube valley parallel with the Bulgarian frontier, the Russians reached that frontier between Giurgiu and the Black Sea. It was now evident that Russia would tolerate no further Bulgarian aid to Germany and that Bulgaria would be compelled to realise that neutrality was not a status that, once lost, could be regained by a simple declaration. Bulgaria's attitude throughout had been treacherous and equivocal. She had long since declared war on Britain and the U.S.A. but had pretended to be neutral towards Russia while giving the Gers. every kind of aid short of sending combatant troops against her. The process of adjusting military relations with the Rumanian and Bulgarian armies might alone have occupied the Russians throughout the month of Sept.; but in fact during that time they had been steadily driving back to the Yugoslav frontier the Ger. forces that had been facing them through the summer on the approaches to the Danube basin—armies which had had to yield 100,000 prisoners in the actions with which this Balkan campaign opened. Events then moved more swiftly toward the overthrow of the Ger. tyranny in the Balkan penin-

sula. Effective co-operation had been estab. between the Red Army's tanks advancing up the Danube and the partisan forces of the Yugoslav National Army of Liberation under Marshal Tito. S. of the Iron Gate Brit. and Amer. land, sea and air forces, too, were co-operating with Tito's army to destroy Ger. escape routes. Meanwhile the other great wave of the Russian advance beating up the barrier of the E. Carpathians had penetrated from the N. into the disputed prov. of Transylvania—of which Rumania had been deprived by the Gers. as a bribe to Hungary. Other columns crossed the Transylvanian Alps and closed in on Cluj the cap., which had a mixed Ger.-Hungarian garrison controlling communications. From W. Rumania strong Russian forces under Marshal Malinovsky were now thrusting into Hungary itself and, by early Oct., were within 100 m. of Budapest. Thus the mt. ramparts guarding central Europe had been largely overcome and the Red Army had penetrated deep into the Hungarian plain. Russia's chief concern about Bulgaria was to cover the flank of the Red Army during its advance towards Yugoslavia and Hungary and therefore war was declared on Bulgaria, which country promptly replied by vainly seeking an armistice. But the next day (Sept. 9) Russian troops crossed the Rumanian-Bulgarian frontier and occupied Rustchuk, Silistria and the Black seaport of Varna. Then at length Bulgaria decided to declare war on Germany and accept Tolbukhin's demands that Ger. soldiers in Bulgaria be handed over as prisoners together with all Ger. ships in Bulgarian ports. These developments left the Red Army forces free to continue their advance through N. Transylvania, for although Rumania was out of the war the Gers. were by no means out of Rumania. There was now in progress a double Russian offensive in Yugoslavia, S. and N. of Petrovgrad, in co-ordination with Tito's operations, which augured well for the early liberation of Belgrade (Oct. 5). On the same day Brit. and other allied forces landed on the Gk. mainland and captured Patras and, soon after, Corinth.

Late in Oct. 1944 Gen. Cherniakhovsky broke through long-prepared defences into East Prussia for some 20 m. on an 85 m. front, his offensive extending many m. N. and S. of the Kaunas-Insterburg-Königsberg railway. But thereafter the offensive was stopped though its main purpose may have been to keep pinned down there great bodies of the best Ger. forces while preparations were made to strike at a more favourable time and only after the most adequate preparations. Meanwhile, at the end of Oct. three groups of Russian armies were advancing in the general direction of Budapest. One group, with Yugoslav allies, was advancing up the Danube plain from Belgrade, which city was taken on October 20. Another was advancing towards Budapest from Debrecen, a large industrial centre of Hungary which fell to Marshal Malinovsky about the same time; while a third group was moving through the Carpathian

Ukraine after one of the bitterest and bloodiest battles of the war for the possession of the mt. passes leading from the Soviet Ukraine into Czechoslovakia. By rapid lunges, the Red Army reached Uzhorod, cap. of the Carpathian Ukraine. Meanwhile the breach of the Ger. defences in East Prussia had been widened to nearly 100 m., but, as indicated above, the Russians had not proceeded further for, before the Insterburg belt of defences could be reached, the Gers. poured in immense masses of tanks and artillery, the tanks being drawn from four picked S.S. divs., and counter-attacked ceaselessly, suffering heavy losses; and there was every reason to suppose that the whole Russian operation on this extremely unfavourable and highly-fortified front, with scarcely elbow room for deployment, was only a diversion which seemed to acquire added importance from the capture of Riga by Gens. Maslennikov and Eremenko some ten days previously.

The Russian offensive in the S.E. had now spread so widely and deeply that it was obvious that the whole of Hungary was the immediate objective. Cluj, the cap. of Transylvania, was taken by Malinovsky on Oct. 11, the Tiza riv. was forced and Szeged, a large economic and administrative centre of Hungary, occupied. Toward the last days of Nov. Marshal Tolbukhin's army crossed the Danube N. of the Drava and broke through on the W. bank of the Danube on a 90-mile front to a depth of 25 m. Pecs, Mohacs and hundreds of smaller places fell. After this followed a month of very obstinate resistance to the Russian invasion of Hungary but, at the beginning of Dec., the Russians pierced the Ger. line in S. Hungary guarding the way to Lake Balaton and the road up to the W. side of the Danube to Budapest. This drive by Tolbukhin from the S. was co-ordinated with the other drives on Budapest from the E. and N.E. Tolbukhin was now advancing northward up the Danube valley supported constantly by fresh forces ferried across the river by a Danube flotilla from the Black Sea. Meanwhile Malinovsky, who had contrived to bring up from the ordnance factories in the Urals a colossal amount of heavy artillery, with which he had now been pounding the Ger. positions for some weeks, had gained control of the S.E. shores of Lake Balaton. It was a considerable achievement to cross the Danube which at this point is a m. wide) by means of pontoon bridges brought up under cover of darkness almost entirely by hand. Thus Budapest was now caught in an encircling movement, for while the combined forces under Tolbukhin and Malinovsky were thus massed S.W. of the cap., fighting was going on N. of the city following the fall of Miskolcz. But the struggle for the city was destined to be bitter and protracted. By Christmas the main forces of the combined armies of the two Russian marshals were investing Budapest, their advanced elements entering the outskirts from the W. and N.W. But still the city did not fall

and on Dec. 28 the battle entered a new stage of stubborn fighting with groups of picked Ger. storm troops, while two Russian armies gripping the city from the W. and the E. massed for the final onslaught.

German occupation of Greece ended.—Civil War in Greece.—In Greece rival resistance groups were fighting one another in the winter of 1943-44—a legacy of the deep suspicion sown among political parties by five years of dictatorship and three of German oppression. The resistance groups were persuaded to cease fighting in Feb. 1944, and in Sept. all Gk. guerilla forces placed themselves under the orders of Gen. Scobie, who had been nominated G.O.C. in Greece. The Gers. evacuated Greece in Sept., their position being hopeless in face of the Russian advance in the Balkans; and when Brit. and Gk. regular forces landed early in Oct. they encountered only rearguards. Before sending troops to Greece the Brit. gov. had obtained guarantees of co-operation from every member of the Gk. gov. and the commanders of the two rival resistance forces—E.D.E.S. (national democratic Greek army) and E.L.A.S. (national popular liberation army, the military wing of the E.A.M. or national liberation front) had also declared their acceptance of the orders of the Gk. gov. and of the supreme allied commander under whose orders the Gk. gov. had placed all Gk. armed forces. Collisions between E.D.E.S. and E.L.A.S. were, nevertheless, still frequent, the latter being communists who, having received arms from the Brit. authorities, did not use them to drive out the Gers. but held them for use later against their political rivals so as to seize the reins of gov. Gen. Scobie therefore announced that the E.D.E.S. and E.L.A.S. forces would be disbanded, and on Dec. 4 he called upon E.L.A.S. troops and police to evacuate Athens and the Piræus by Dec. 6. But the E.L.A.S. then attacked the Brit. naval headquarters and sharp fighting followed between the E.L.A.S. forces and the Brit. troops in Athens, who small in numbers, were for a time hard pressed. The E.L.A.S. committed atrocities on their political opponents of a character rivalling the excesses even of the Gers. Hundreds of hostages, including women and children, were butchered in cold blood. But as the days passed, Brit. reinforcements arrived from the It. front. Street by street Athens was cleared (see further under GREECE—History).

Stalin launches his general offensive in South Poland, Upper Silesia, and East Prussia.—For five months the world watched and waited, wondering at the delay on the E. Front where nothing seemed to be happening beyond the protracted struggle for Budapest and intermittent operations in the Baltic States. But meanwhile preparations were being made on an immense scale behind the Russian lines which, as has been noted, held solid bridgeheads on the Vistula and Narew around Sandomierz and Lomza respectively. By mid-Jan. Marshal Stalin was satisfied that he could maintain the

momentum of an offensive which should have as its immediate objectives the capture of industrial Silesia and the over-running of all W. Poland and E. Prussia, and also the invasion of Brandenburg and Pomerania, with remoter objectives of Stettin and Berlin and the destruction of the whole Wehrmacht. But his first pre-occupation was to draw off Ger. reserves from the central Polish front and in this he was helped by the concentration of the Sixth Panzer Army under von Rundstedt for a decisive onslaught on the Amer. army in the Ardennes in Dec. thereby robbing the E. front of armoured reserves (see WESTERN FRONT IN THE SECOND WORLD WAR) and by the diversion of a considerable part of the remaining Ger. armour to Budapest and Latvia. The defeat of von Rundstedt by Field-Marshal Montgomery and Gen. Omar Bradley prevented the Sixth Armoured Div. from being turned E. for the defence of the E. Front, while the diversion of the floating Ger. armoured reserves to Budapest and Latvia, instead of menacing the S. and N. flanks of the projected Russian offensive, merely resulted in a fatal dissipation of Ger. reserves and in the locking-up of their armies of E. Prussia and the Baltic, while effecting nothing in the attempted relief of Budapest. At the start of the Russian offensive, the Gers. disposed about one-hundred and fifty divs., of which no fewer than fifty were in the Baltic States and on the Danube. The Ger. High Command was well aware of an impending Russian offensive but were surprised by both its weight and speed. For everywhere the Russians in the first two or three weeks of their amazing attack advanced at twice the rate of their advance in the summer or a total average distance of over 200 m. and in that short space of time they had overrun a large part of Upper Silesia, swept through the whole of W. Poland and isolated E. Prussia. They concealed their true intentions as to place and time with much cunning, causing the enemy to displace reserves by deceiving him with wooden tanks, dummy guns and march and counter-march of infantry. The great offensive was opened by Marshal Konev's First Ukrainian Front from the Sandomierz-Baranov bridgehead on the Upper Vistula—a bridgehead he had held since Aug. The point of impact had thus been plainly indicated on the strategic map for many months and indeed the Gers. had, as they believed, prepared sufficiently strong defensive positions. The weight of the Russian artillery barrage on the opening day (Jan. 12) surpassed anything in the previous experience of Konev's troops and indeed impressed both sides as outstandingly terrible, accustomed though they were to the awful cannonades of E. Europe. The Gers.' prepared positions were so completely overwhelmed that in two days the Russians broke through to a depth of 25 m., their armoured spearheads careering clear of the fortified zone so as to win that freedom of manoeuvre which the Red Army commanders had always known how to exploit with such decisive power.

Before Konev's army now lay the open plain of S. Poland, broken only by the low hills N.E. of Cracow—terrain well-suited to the movement of armoured and mechanised forces. Beyond this plain lay the road to the Ger. border and the phenomenally rich industrial region of Upper Silesia, doubly valuable to the enemy's war production on account of its relative immunity from Brit. and Amer. bombs. Two days later Konev took Kielce, one of the biggest Ger. bases between the Vistula and the Ger. frontier and the junction of two main railways running E. from Germany. In three days Konev had advanced 50 m. beyond the Vistula.

On Jan. 14 Marshal Zhukov's First White Russian Front assumed the offensive on two fronts on the W. bank of the Vistula S. of Warsaw from the Pulawy-Warka sector with massive artillery support and soon broke through the enemy's powerful deeply-staggered defences. In three days the two fronts linked up and advanced 37 m., having extended the breach in the Ger. lines over a front of 74 m. while overrunning the strongly-fortified Ger. defence points of Warka, Grojec, Solec, Zwolen and Jedlinsk and occupying more than 1300 other tns. and vils. Soon afterwards Zhukov's troops carried by storm the important industrial and communication centre of Radom, 60 m. S. of Warsaw, and a strong bastion in the enemy's defence system. This immensely powerful blow by the First White Russian group of armies under the famous marshal who had saved Moscow was skilfully co-ordinated with Konev's attacks to the S., so that the two most formidable Russian army groups were now striking W. along a massive front of 120 m. on the shortest road into Germany. Almost simultaneously, with the opening of Zhukov's attack, troops of the 2nd White Army front, under Marshal Rokossovsky, began an attack N.W. of Warsaw, carrying by storm the bastion of Przasnysz and the tn. and fortress of Modlin. The former place being 17 m. S. of the E. Prussian border on the main Warsaw-Königsberg highway indicated that the objectives of this new offensive was to strike at E. Prussia from the S.

Warsaw fell at this time to Zhukov as the result of a co-ordinated triple operation which was only launched when a huge weight of mobile force had been concentrated on the Vistula S. of the city to make a decisive lunge north-westward across the roads to Lodz, and when sufficient force had been concentrated on the Narew to throw the Gers. back towards the Baltic and prevent a counter-offensive against the Russian right flank. This complex operation was conducted with extraordinary speed, the decisive battle being that fought at Grojec, 25 m. S.W. of Warsaw. The combined operation tore the whole Warsaw area from the Gers' grasp and laid bare the road to Lodz. While the Russian infantry were taking the ruined Polish cap., Zhukov's tanks were spread around it at some points as much as 50 m. away on guard for Ger.

counter-blows and all the time pushing outwards to the W. Meanwhile Konev had taken Piotrkow, an important stronghold in the direction of Lodz. Two days later Konev, advancing W. of Czesochowa, broke through strongly-fortified defences on the S.E. border of Germany and advanced into Ger. Silesia on a 60-mile front, capturing Kreuzburg, Rosenberg, Guttentag, Landsberg, and Pitschen—all powerful strongpoints in the defences covering the roads to Breslau. At this date yet another offensive was in progress, this being the advance of the Third White Russian Front under the Jewish general, Marshal Cherniakovsky, who carried by assault Tilsit, the largest tn. in the N. frontier zone of E. Prussia, and Gumbinnen, the important junction and stronghold in the enemy's defences in the Königsberg direction. Marshal Rokossovsky, co-operating with this army, had now crossed the E. Prussian border in the S., and captured Tannenberg, the burial-place of Hindenburg, whose memorial had been previously destroyed by the Gers. Other tns. taken by Rokossovsky included Neidenburg, Allendorf and Jedwabno.

By Jan. 20 Zhukov's group of armies, which included the greatest accumulation of armour ever seen on the E. Front, had passed more than 100 m. from Warsaw and now stood over half way to Poznan, the last of the historic cities of Poland still held by the enemy. Powerful blows by tanks and infantry overwhelmed the garrisons on the way to Torun (Thorn) and Bydgoszcz (Bromberg), tns. of Posen prov. Thus Marshal Zhukov had advanced many m. ahead of the Ger. garrisons still holding out on the right bank of the Vistula, notably at Plock, leaving garrisons there to be destroyed by the oncoming infantry. Lodz fell at the same time, and so swift was Zhukov's advance that the city was taken intact with all its great textile factories. Cracow, too, which fell to Konev at this time (Jan. 22-23) also escaped Ger. demolition and also the tns. and viks. of the entire strategic industrial triangle of Poland were found to have suffered very little. At Cracow the Russians found mines in the famous Wawel castle, in the churches and even in the tombs of the Polish kings. Large gains of ter. were made on Jan. 22 by the Russians in their double advance into E. Prussia from the S. and E. By the capture of Allenstein (Olsztyn), Rokossovsky had reached the heart of the prov. while Cherniakovsky, advancing from the E. captured Insterburg. By the capture of Allenstein the Russians cut the main railway from Berlin to the Baltic States. At the same time the Russians also took Osterode 22 m. S.W. of Allenstein and Deutsch Eylau, powerful Ger. strongholds. Yet a fifth Russian army group, that under Gen. Petrov, was now advancing along the N. slopes of the Carpathians and Tatra Mts. in Slovakia, with the intention of securing the Carpathian passes and reaching the E. approaches of the Morevian gap along the N. slopes of the Beskids. It was through this gap be-

tween the Sudeten Mts. and the W. Beskids region that the Ger. army in 1939 struck one of its most crippling blows at Poland.

Konev reached the Oder on Jan. 23 on a 40-mile front in the area of Breslau. On the same day Zhukov captured Bydgoszcz by a combined frontal and encircling move; while Rokossovsky took many more E. Prussian tns. including Ortelburg, 25 m. S.E. of Allenstein and E. of the Masurian lakes area, scene of the battle of Tannenberg in 1914. Large Ger. forces had taken up positions to challenge the Russian advance S.E. of Poznan but Zhukov by-passed them, leaving them to be forced into the salient between his and Konev's fronts. Nothing could stay the Russian offensive. On the 24th Konev seized Oppeln, the cap. of Upper Silesia and advanced to within 5 m. of Breslau on the S.E. Simultaneously other forces of Konev cut the railway from Breslau to the N. by taking Rawicz and Trachenberg. In Poland Zhukov's troops captured Kallsz, main centre of communication between Poznan and Cracow. Also at this time a new Russian offensive was launched in Slovakia, where Marshal Malinovsky's troops broke through the defences on a 25-mile front and took Rozniava and Yelsava N.W. of Miskolcz. Gradually it was being revealed that the Red Army's triumphs were due not so much to superiority in numbers or to the Ger. blunder in reducing their armour to a dangerously low level as to the advantage the Russians enjoyed in having a better equipped and swifter moving fighting force, commanded by generals of greater ability than the Wehrmacht. On front after front the Gers. were out-generalled, out-maneuvred and out-fought. A feature of the whole campaign was the manner in which infantry and tanks combined in the great vanguards which plunged through the Ger. lines. Tanks never advanced alone. With them went motor borne infantry, sometimes cavalry, and always squadrons of self-propelled guns. Their collision with the Gers. was so shattering that when the main armies lunged forward in the wake of these vanguards they found entire divs. with all the light knocked out of them.

Rokossovsky reaches the Gulf of Danzig.—*Zhukov invades Pomerania and Brandenburg.*—*Fall of Budapest, Danzig, and Königsberg.*—There was still no halt in the forward surge of the Red Army from the Baltic to the Low Tatra when the Russians captured Gleiwitz in the heart of the Upper Silesian region on Jan. 25, and Chrzanow, a large tn. in the Dombrowa coal basin. In a few sectors Ger. resistance stiffened, notably from the region S. of Elbing and from E. of Königsberg; but the Ger. divs. were fighting separately without plan; while in some resistance was stubborn, in others submission was prompt so that great lines of Ger. captives were to be seen trailing along the Polish roads from the scenes of the Red Army's mighty victories. The capture intact of the Insterburg bridges and the failure of later Ger. attempts to destroy them by

long-range artillery enabled the Russians to move numerous batteries across the Pregel so as to crush Ger. counter-battery fire from the Wehlau dist. On Jan. 26 Rokossovsky's forces captured the E. Prussian tns. of Marienburg and Mühlhausen and reached the Gulf of Danzig, thus cutting off the E. Prussian garrison from central Germany. At the same time the other invading army, under Cherniakovskiy, seized Allenburg, Tapiau, Lötzen—strongholds in the Ger. defence zone constructed over a long period and covering the approaches to the central dists. of the prov. In the Breslau area on the same day the Red Army crossed the Oder at sev. places, while Zhukov's armoured forces were now only 100 m. from Berlin. Between Jan. 12-26 Ger. losses exceeded 380,000 men killed or captured. This stupendous offensive had thus carried the Red Army in some places more than 250 m. from their starting points on Jan. 12. There was no hope of a planned withdrawal by the Gers., whose propagandists were dismayed by the serious situation. Yet the Gers. had been well aware that the offensive was coming, and, for sev. months, they had strengthened the fortifications along the entire Vistula line and all over E. Prussia which, with its many lakes and marshes, is pre-eminently suited to defence. But everywhere they failed; everywhere powerful Russian concentrations swept through the carefully-prepared 'defence belts,' and, overwhelmed by the power of the Russian drive, large forces of the Gers., fearing encirclement, fled in the desperate hope of reaching the Oder. How swift was their flight could be judged from the fact that innumerable Ger. units were hiding aimlessly in the Polish countryside, not realising that their front line—in so far as it was a line at all—was now more than 100 m. away. In Lodz Ger. civilians and even soldiers were travelling on tram-cars when the first Russian tanks broke into the city.

Troops of the Fourth Ukrainian Front under Gen. Petrov, continuing their offensive in the Carpathians over difficult mountainous and wooded country, captured Nowy Targ on Jan. 29, 38 m. S. of Cracow and a powerful strongpoint in the enemy's defences. Elsewhere on the same day Zhukov's forces broke into Ger. Pomerania while Cherniakovskiy advanced to within 2 m. of Königsberg. One consequence of the smashing of the stronghold of E. Prussia was the fall of Memel, the garrison of which was being supplied along the Kurland Spit. The Russians found the harbour installations and public buildings of Memel wrecked and almost the whole pop. had been evacuated. The linking up of Rokossovsky's forces and those of Zhukov in the Bydgoszcz area led to an immediate improvement in their positions in relation to the Danzig-Berlin railway. Zhukov's troops on the banks of the Odra in the prov. of Poznan, decisively cracked the Odra defence line, forced the riv. and then advanced rapidly along the Netze valley and across Brandenburg. They burst through the Netze-Drage line

on Jan. 31 carried the Red Army across the Danzig-Berlin autobahn and the main railways connecting the two cities. Despite ferocious Ger. resistance in Pomerania, the main Russian forces bit deeply into the fortified zone extending from Schniedemühl along the R. Netze to Kreuz, frost aiding the offensive. The next places to fall to Zhukov in his advance across Brandenburg and Pomerania were Meseritz, Schwiebus, and Züllichau—all powerful defences covering the approaches to Frankfurt. Zhukov's central army group, striking along the shortest route to Berlin, was now about 30 m. deep into E. Brandenburg and 24 m. from the Oder, the last great water-barrier before the Reich cap. Meanwhile 50 m. behind the front the Poznan garrison was taking terrible punishment as the Russians methodically cleared the city block by block, groups of sev. hundred Gers. being wiped out, the proportion of killed to captives being in some cases ten to one. Torn on the Vistula and an important rail junction linking Berlin, Insterburg, Warsaw and Danzig, which had been surrounded for some time, was taken by Rokossovsky on Feb. 1. On the same date Schniedemühl (90 m. E. of Stettin) was encircled and the destruction of its garrison methodically begun. By estab. themselves at Heldekrug on the Frisches Haff, the Russians had now completed the envelopment of Königsberg from the N. and obtained control of its ship canal. Königsberg's plight was extreme, crammed as the city was with 150,000 refugees. Day and night Russian troops were shelling it at point-blank range.

Marshal Zhukov was now taking the risk of developing a straight break through the centre and on Feb. 1 he came down from Landsberg to within artillery range of Küstrin, the fortress city at the confluence of the Wasta and the Oder, while a parallel column moving from Schwiebus made for Reppon, the last railway station before Frankfurt. On the same day the first big mass of Ger. reserves comprising also Volksturm (Home Guard) was hurled across the path of Zhukov; but the Gers. were beaten out of the field in tank actions. Frankfurt was the centre on the Oder for covering Berlin, but Zhukov with mobile armour forces was also bringing round his right to turn the central defences to the N. The Red Army's advance on canals and railways was now beginning to exercise a stifling grip on the whole of the E. regions of the Reich. Over the entire area E. of a line drawn S. of Stettin along the Oder bank Ger. supply channels were now in great confusion. They were crammed with refugees, columns of army transports and masses of troops whose orders for battle were sometimes changed in a few hours as new road and railway junctions fell. Meanwhile Berlin was preparing itself for grim defence and a system of trenches was being dug around the cap. and strongpoints prepared in the outskirts. A rapid thaw at the beginning of February impeded Zhukov's attempts to force the passage of the Oder, though by capturing Sonnenburg he was only 5 m.

E. of Küstrin. But Marshal Konev crossed the Oder S.E. of Breslau and in three days' fighting extended his bridgehead along a 50-mile front while advancing 12 m. The capture of Fürstenberg put Zhukov only three m. from Frankfurt. Ger. resistance on the Oder in front of his armies had now stiffened very considerably as also in the vicinity of Stargard, 20 m. E.S.E. of Stettin. The Ger. pocket in E. Prussia, which a few days earlier was about a thousand sq. m. in extent, was now shrunk to 600 sq. m. and only some half dozen tns. in the central area of the prov. remained in their hands.

In Budapest the Gers. had now been driven to the foot of the hill on which stood the Royal Palace, and this area above the Danube was under heavy fire. Here, in the gipsy quarter, the Russians found the entrance to a vast underground factory making parts of Messerschmitts, the entrance being disguised as a pottery workshop. From it tunnels, fitted with elaborate machinery and underground roads for motor traffic, stretched for m. Thousands of workers employed there rarely saw the daylight.

By the capture on Feb. 11 of Liegnitz, one of the largest tns. in Silesia, Steinau, Lüben and other tns., the Russians cut the Breslau-Berlin railway, besides almost surroding Breslau. This advance of nearly 40 m. carried Konev's armies across the Oder in great strength, besides widening their breach to 100 m. At the same time troops under Rokossovsky captured Elbing, the second city of E. Prussia; while Cherniakovsky's forces took Preussisch Eylau besides breaking up the strong Ger. defence zone based on that tn. and on Kreutzburg and Landsberg. The fall of Elbing marked the end of a phase in which the Gers. still had some hope of driving the Russians from positions which barred the eastward escape of the Ger. forces penned in the central region of the prov. Preussisch Eylau was the main Ger. resistance point between the Pregel and Alle and it was from there that the Gers. vainly tried to advance northward to reach Königsberg. Most of the forty submarine plants, chemical factories and power plants in the Elbing area were taken intact by the Russians; but the streets were littered with debris and Ger. dead. Meanwhile on Feb. 12 Gen. Petrov, advancing over the broken and forest-covered country of the Carpathians, stormed the tn. of Bielsko an important bastion in the Ger. defences covering the approaches to Moravska-Ostrava, the N. entrance to the famous Morava Gap. Buuzlau on the Bober fell to Konev on the same date, thus taking his forces to within 75 m. of Dresden.

Budapest fell at last on Feb. 13 after six weeks of the most bitter fighting in the difficult conditions of a large city. All organised resistance to Malinovsky and Tolbukhin ceased with the capture of the Royal Palace and of all the little rococo mansions of the aristocratic quarter which extends down the N. side of the hills overlooking the Danube. The enemy clung tenaciously to the large ministerial build-

ings and the Russians had to fight their way to the roofs. Crowds of spectators on the other bank of the riv. watched the final stage of the battle. During the battles in the city the Russians took more than 110,000 Ger. and Hungarian prisoners, while Ger. and Hungarian dead numbered 49,000. The fall of the great city was the culmination of a campaign of which the strategic value was obvious. The vast turning movement, which brought the Red Army through Rumania and up the Danube valley, created a situation in which the Russians were able to sweep across Poland with decisive superiority in armour; for there came inevitably a moment when Malinovsky seemed to be on the point of an advance through the Morava gap and it was then that the Gers. felt compelled to transfer a tank army from S. Poland to Budapest. In fact the Red Army's strategists had given the Gers. no option, and to describe the Ger. decision as mistaken is to withhold from the Russian strategists the credit due to their enterprise.

Having now shattered the Ger. line of defence on the Bober Konev's forces on Feb. 14 captured sev. more Silesian tns. including Neusalz, 75 m. down the Oder from Berlin. Konev's armies now held 150 m. of the upper Silesian industrial basin. The same day Zukov's troops stormed the long-encircled tn. and fortress of Schneidemühl, a powerful support-point in the Ger. defences in E. Pomerania and an important railway junction on the main Berlin-Danzig trunk line 60 m. W. of Bromberg. More than 5000 prisoners were taken and 7000 Gers. were killed. Brit. and Amer. bombers now took a hand in the Silesian campaign by making sev. very heavy attacks on Dresden and Chemnitz on the night of Feb. 13. The night assault was followed by day attacks by 1350 Amer. heavy bombers and 900 Amer. fighters, and 1400 R.A.F. aircraft also took part. At this moment Dresden was a place of vital importance to the Gers. for controlling the defence against Konev whose forces, by capturing Grünberg and Sommerfeld, were within 10 m. of the stronghold of Cottbus and further S. less than 60 m. from Dresden (Feb. 13). Near Züllichau, 12 m. N.E. of Grünberg, Konev's right wing estab. contact with Zhukov's left, and thereby foiled the Gers.' last hope of forcing a wedge between the two fronts.

Russian infantry was now moving up in force to the fortified water barrier of the Nisse protecting Saxony and S. Brandenburg, while armoured units had reached the r. b. of the riv. The Gers. launched strong counter-attacks between Landsberg and Stargard against Zhukov's armies in Pomerania, but suffered heavy losses. The purpose of these attacks was to try and halt the Red Army's converging movement towards Stettin and the Baltic. Gen. Cherniakovsky's troops were advancing through Pomorze along the Bydgoszcz road to Danzig. On the same day (Feb. 18), however, Gen. Cherniakovsky was killed. He was the

youngest group commander in the Red Army and one of its outstanding strategists. The outline of Zhukov's great salient in the centre of the Eastern Front remained more or less unchanged for some weeks. Meanwhile, as has been noted, the main Russian effort was directed towards Stettin, Danzig and the Baltic coast generally. Rokossovsky's purpose, in advancing northward astride the old Polish corridor, was to form up on Zhukov's right and so protect the N. flank of the latter's salient. It was obvious that this flank could not be secure while Schoerner's force still remained in

berg, while 30 m. to the N.E., Rokossovsky's men reached the coast from Köslin, thereby cutting the Stettin-Danzig road and railway and threatening to isolate both Danzig and the Polish port of Gdynia from the rest of Germany. Next day the main weight of Zhukov's armies, having turned westwards towards the lower Oder, captured Stargard, together with Nangard and Polzin, all powerful strongholds and centres of communication in the direction of Stettin. This offensive, besides pinning large Ger. armies against the Baltic coast, forestalled a Ger. counter-offensive which was planned to strike at



RED ARMY CAVALRY CROSSING A RIVER IN HUNGARY

Soviet Weekly

Courland to occupy the attention of Eremenko's and Masiennikov's Baltic armies and thereby to deny to the Russians the use of the ports of Liepaja (Libau) and Ventspils while also limiting the usefulness of Riga. This explains the tenacity with which the Gers. held Königsberg and yet more, Pillau, which latter barred the only outlet from the Frisches Haff. In the S., too, the Gers. were offering a very dour resistance to Marshal Malinovsky on the lower Hron riv. in S. Czechoslovakia. Troops of Zhukov's armies, after a month-long siege and obstinate fighting, at length on Feb. 23, completed the rout of the Ger. forces encircled in Poznan (Posen) and on that day they fully occupied the fortress. During the fighting for Poznan the Russians took 23,000 prisoners; in killed alone the Gers. left over 25,000 on the field.

On March 4 Russian forces, in a spectacular advance of over 60 m., reached the Baltic at two places in Pomerania. Zhukov's troops reached the area of Kol-

berg, while 30 m. to the N.E., Rokossovsky's men reached the coast from Köslin, thereby cutting the Stettin-Danzig road and railway and threatening to isolate both Danzig and the Polish port of Gdynia from the rest of Germany. Next day the main weight of Zhukov's armies, having turned westwards towards the lower Oder, captured Stargard, together with Nangard and Polzin, all powerful strongholds and centres of communication in the direction of Stettin. This offensive, besides pinning large Ger. armies against the Baltic coast, forestalled a Ger. counter-offensive which was planned to strike at

the right flank of the great Russian salient stretching to the middle Oder. A powerful concentration of crack Ger. units had been amassed in Pomerania behind the line which had been hastily improvised after the Red Army had pierced the 'Pomeranian wall' at Schneidemühl, but Zhukov anticipated the Ger. attack by diverting armoured units from Brandenburg. After very stubborn fighting the strongly-defended tn. of Küstrin on the E. bank of the Oder fell to Zhukov. This was the prin. Ger. strongpoint cramping the Red Army's communications (March 11). During this time there was also heavy fighting N.E. and E. of Lake Balaton in Hungary where the Gers. were making frenzied efforts to get back to the Danube, but their attacks were held and Zvolen fell to the Russians on March 14. Russian forces advancing across the Polish corridor from Pomerania, reached Danzig Bay and captured Tczew and Neustadt, outposts of Danzig. Fighting their way along the Frisches Haff to Heide-Waldburg the Russians, on March

15, split the Ger. E. Prussian army group in two.

The main weight of the Russian offensive was now directed to the flanks of the E. Front, the immediate objectives on the N. flank being the Baltic ports of Gdynia and Danzig and the city and fortress of Königsberg, on the S., Bratislava and Vienna. Königsberg, the very symbol of Prussian might, was not lightly to be overwhelmed, the more especially as it had been fortified almost beyond measure and contained a very large garrison which had been swollen by forces pressed back by Cherniakovskiy. The garrison in Feb. had made a very powerful thrust and it was only by mid-March that the Russians restored the position by advancing across the coastal road linking the Königsberg garrison with the small fortified tn. of Brandenburg and by isolating the Ger. garrison in Braunsberg, a powerful strongpoint in the Ger. defences on the shores of Frisches Haff lagoon. Marshal Vassilievskiy (Cherniakovskiy's successor) took Braunsberg on March 20. Danzig was cut off from Gdynia with the capture of Zoppot situated on the coast between the two (March 23). On the 27th Rokossovskiy's troops occupied a dozen suburbs of Danzig and broke into the centre of the city, besides breaking into the tn. of Gdynia. The latter was carried by assault on the next day, thus giving the Russians an important naval base and large port on the Baltic. About 9000 prisoners were taken there. At the end of the month the Russians completed the capture of Danzig, hoisting the Polish flag over the city whose name was changed to the Polish version, Gdansk. Danzig had not been Polish since 1793. Some 10,000 Ger. prisoners were captured and 39,000 Gers. fell during the siege.

Vassilievskiy's troops completed the capture of the city and fortress of Königsberg on April 9. Thus went the most important stronghold in the Ger. defences of E. Prussia. Its capture by the Russians meant that, with the exception of small Ger. groups, the Baltic shore was now entirely cleared, from the German pocket in Courland to the mouth of the Oder opposite Stettin. Now that the city had fallen, the Red Army would be able to bring up large quantities of supplies by sea from the Leningrad area, avoiding the long journey across Russia. During the fighting in Königsberg between April 6 and 10, the Russians took 92,000 Ger. prisoners and, in that period, the Gers. lost in killed alone, 42,000 men. Among the prisoners were four generals and 1819 other officers. Large captures of guns and tanks were made.

Capture of Bratislava and Vienna.—The Battle for Berlin.—Capture of Stettin and Moravska Ostrava.—In the S. the Gers. had staged a tremendous effort to win back ground E. of Lake Balaton, in the vain hope of re-taking Budapest or, at least, to safeguard Vienna, with the view, possibly, of building up an 'impregnable' fortress in the S. of Europe from Munich to Hungary and southward to the It. Alps. Hence armoured forces were squandered

lavishly in all-out attacks on the further side of Lake Balaton. The forces of Tolbukhin 'cushioned' the impact of these hammer-blows which at length in the middle of March began to weaken considerably and, on the 18th, the Russians had struck back in the direction of the Bratislava Gap and Vienna. The speed with which Tolbukhin was able to switch over to the offensive is explained by the fact that the Soviet Command, all through the battles in W. Hungary, kept its operational reserves intact. He struck in Hungary on March 20, and in a week his forces were only 30 m. from the Austrian border, as well as driving along the N. shores of Lake Balaton on the way to Slovenia. In co-ordinated attacks, Marshal Malinovsky, driving along the S. bank of the Danube, took the strongholds of Győr and Komarno on March 28, both being important strongholds in the Ger. defences in the direction of Vienna. Tolbukhin crossed the Austrian frontier 50 m. S. of Vienna on March 30, while Malinovsky forced the river. Hron and Nitra and took a number of strongholds in the defences in front of Bratislava. Wiener Neustadt, railway junction and engineering tn. 22 m. S. of Vienna, was occupied by Tolbukhin on April 3, together with Eisenstadt, cap. of Burgenland, while on the same date Malinovsky took Kremsitz, 90 m. N.E. of Bratislava, and other strongholds S. of that city. This remarkably swift co-ordinated advance was now jeopardising lines of vital importance to the defence of lower Austria. Bratislava, cap. of Slovakia, was carried by assault by Malinovsky's troops on April 4 and its elimination left him free to advance on Vienna from the E., while Tolbukhin was coming up from the S.

Battle was now joined for Vienna, for the Gers., swept back to the very approaches by the night of April 3, were fighting fiercely to save the Austrian cap. Tolbukhin's tanks were then in the Baden area, 12 m. S. of Vienna, where he had to meet Ger. forces augmented by the defeated and fugitive garrison of Bratislava. On April 5 the Russians were at the gates of Vienna and had cut the Vienna-Linz highway. Very soon Vienna was almost encircled, for Malinovsky was swiftly advancing along the N. bank of the Danube. On the night of the 6th Tolbukhin's forces fought their way into Vienna after the city had been under shell-fire for several hours and the Gers. had made a futile broadcast appeal for a last stand by the garrison and people. The bells of St. Stephen's Cathedral, which sounded the tocsin when the Turks were at the gates of the city in 1529 and 1683, were again pressed into service by the Gers. for this broadcast. The relative ease with which the Russians were now advancing was bought in a long series of fierce battles fought mostly between Lake Balaton and the Danube, around and in the heart of Budapest, around and in the heart of the banks of its trib. the Hron. The Gers., having, as we have seen, concentrated large forces, attacked repeatedly, regained

ground on both sides of the riv. and, to the N. drove the Russians out of their hard-won bridgehead on the Hron. Yet neither this local success nor that achieved on a wider front N. of Lake Balaton ever acquired a strategic significance and their essential effect was merely to wear out and deplete the forces engaged to such an extent that they were utterly unable to stand up to the inevitable mighty Russian counterblows, which were delivered with exemplary promptitude. As the Red Army closed in through the Penzing and Favoriten dists. of Vienna and passed through the electric power station and the gasworks on the edge of the Prater, bodies of Viennese workmen and students came to meet them with red flags which 'had lain in hiding since the time when the display of such flags was proscribed.' Thus had the whirligig of time brought its revenge from the days (1934) of Nazi persecution when Dollfus was murdered. Tolbukhin's troops, in co-operation with Malinovsky's, after stubborn fighting in a built-up area W. of the Danube, captured all Vienna, having taken 130,000 prisoners between March 16-April 13, routed 11 tank divs., destroyed 1345 tanks and self-propelled guns and 2250 field pieces. The Red Army's tactics saved most of Vienna's celebrated buildings from serious harm. In fighting for the city the Russians, instead of advancing along the streets, moved through courtyards, breaking down walls where necessary and thereby neutralising most enemy fire-points. Such damage as was sustained by the Schönbrunn palace and Parliament building was due to Ger. incendiary shells. Austrian militiamen assisted the Russians in the administration of the city. After the bitter fighting in the city cemetery Russian soldiers tended the graves of Beethoven and Johann Strauss, laying a wreath of red roses in Strauss's honour. But after the Russians had liberated the city Ger. thermite shells set many famous buildings ablaze and damage was done to the Rathaus, Franz Josef Palace, the opera house and part of St. Stephen's Cathedral. Exploiting their capture of Vienna, Tolbukhin's forces rapidly advanced up the Danube valley, while Malinovsky pushed on between the Morava and the Vienna-Brno highway, the Gers. being hustled back across Lower Austria towards Moravia.

Ger. forces in E. Prussia were now (April 18) confined to a six-mile peninsula enclosing the Frisches Haff and to small parts of the cape between Fischhausen and Königsberg, both areas being packed with men and equipment including what had been evacuated from Danzig and Gdynia. These suffered great damage from Russian artillery, which was also annihilating the remnants of the enemy pressed against the port of Pillau from which, just previously, 9000 prisoners had been taken.

The Battle for Berlin.—Zukov began the battle for Berlin. The building up of the striking-force had been in preparation for two months; but it was not until Himmler's Pomeranian group of armies

had been destroyed, and Danzig captured, that his plans reached their maturity. Reconnaissance activity between April 15-17 increased on the 18th to full-scale battles for the estab. of bridge-heads over the Oder and Neisse. Muskau and Weisswasser, 80 m. S.E. of Berlin were captured by Konev. A Polish army took Rothenburg. Soon afterwards Konev's forces were across the R. Spree 12 m. from Cottbus. Other Russian troops were in the suburbs of Bautzen in Saxony. A second Polish army was across the Neisse. By the 20th, the Red Army was ranged in an arc about 25 m. from Berlin. Two days later Zukov's and Konev's troops had captured many suburbs of Berlin in advances from sev. directions, including Weissensee only 3 m. from Unter den Linden. From E.N.E. and N. the armies of Zhukov and from the S. those of Konev, were inexorably closing all round the doomed Reich cap. During the 22nd, over a dozen suburbs were taken, including Buchholz, Blankenburg, Glienicke, and Lübars, from 3 to 10 m. distant from the centre. Zhukov had brought a huge force of armour, accompanied by veteran assault troops who had fought at Stalin-grad. These were now moving on the E. and N.E. periphery of Berlin and in the teeth of fanatically desperate resistance were challenging the Ger. artillery. Stormovik dive-bombers, operating by day and night, were sweeping the Ger. lines from low altitudes and thwarting counter-attacks. The city's military defence was placed under the command of Lieut.-Gen. Heymann though later, it was asserted that Hitler was directing the defence in person. In an hysterical broadcast Goebbels declared that all who showed cowardice or hoisted the white flag would be treated as outlaws. Confidence was felt in Moscow that Berlin would fall in ample time for May Day celebrations and already Red Army troops swinging round the N. fringe of the cap., were pushing towards Spandau, Charlottenburg and Potsdam to the S.W. But following his usual practice of withholding information until he could announce an accomplished fact, it was not until April 23 that Stalin announced that the Russians had 'broken into Berlin.' Zhukov's forces, after passing to the offensive from their bridge-heads on the W. bank of the Oder, broke through strongly fortified and deeply staggered Ger. defences covering Berlin from the E. and in less than a week had advanced from 40 to 62 m. During this time they captured the tns. of Frankfurt, Wandlitz, Oranienburg, Birkenwerder, Pankow, Friedrichsfelde, Karlshorst, Köpenick Genningsdorf—all at distances ranging from 15 to 4 m. from the centre. Konev had broken into the city from the S. also through deeply echeloned defences, on the Neisse, and had advanced from 50 to 95 m., occupying the important tn. of Cottbus and also Lüben, Zossen, Luckenwalde, Teltow and others. At the same time in the direction of Dresden, other forces of Marshal Konev had reached the Elbe. The assault on Berlin raised the Russian mood to a pitch of exaltation

comparable only to that witnessed in the historic battle for Stalingrad. Guardsmen went into battle with small red flags like a relay-runner's token, passing them on to comrades as they fell. When the first heights were taken these emblems fluttered all along the crest of the hills N.E. of the city.

When, on April 25, the armies of Zhukov and Konev joined hands, N.W. of Potsdam, Berlin was surrounded and all roads leading westward from the cap. were cut. The Red Army was now striking relentlessly towards the centre of Berlin from N., E., and S. Most of the factory dist. was already in their hands, and tank, aircraft and gun factories were captured on the same date. The fighting was bitter in the extreme, each side employing a great amount of artillery, probably greater than was ever gathered together in any battle for a city. Ger. preparations for the defence were designed in the hope of absorbing the Russian forces by attrition at as many points as possible over a wide region of built-up areas. At every cross-road were concrete forts, and among the ruins artillery was widely dispersed, together with heavy machine-guns. But the Russians were skilled and experienced in street-fighting and spread confusion in the Ger. ranks by fighting their way—as in Vienna, through yards, walls, and buildings, where possible thereby avoiding the roads. Next evening (April 26) the Russians took the suburb and radio centre of Königs-Wusterhausen, the industrial centre of Siemensstadt, and Dahlem. That day regiment after regiment of Soviet troops poured into Berlin foregathering for the final assault. The wide four-lane highways converging on the cap. were packed with guns, tanks, lorries and amphibious vehicles. Everywhere, on vehicle, street, wall and fence appeared the slogan 'Dayosh Berlin' ('Let us have Berlin'). From all sides now Russian guns were turned on the centre, while behind the advancing Red Army the subjugated ter. was quiet. The Gers. were using all types of artillery for street fighting and the Luftwaffe was now chiefly in battles over the city in and around the huge column of smoke that was rising from its heart. Ger. civilians sought refuge behind the Ger. lines. They included many workers from the factory dists., some of whom had resisted with arms the attempts of the Gestapo to force them into the city. On the following day (April 27) the Russians took the suburbs of Spandau, Potsdam and Rathenau and, in the cap. itself, the industrial dist. of Neukölln, besides the vital airport of Tempelhof. Gers. and Russians were now using ammunition of a kind far more destructive than ever the Gers. had used against the Russian cities. Under this concentration of fire what remained of Berlin after the allied air raids now suffered tremendous damage. Familiar architectural features were fast disappearing in piles of rubble through which the Russians cleared narrow lines for their infantry. At the end of the sixth day (April 29) of the battle in the streets of the

cap. the Red Army, having taken Moabit bordering on the Tiergarten (Zoological Gardens) and the Anhalter Station, had ringed the inner area and hacked its way through almost to the edge of the Tiergarten. Civilians, crazed with hunger and shell-shock, were looting shops. The police were helpless and many sought safety in surrender. On April 30 Zhukov's troops hoisted the banner of victory on the Reichstag building. They also captured the central post office building, the building occupied by the ministry of internal affairs and 200 blocks of buildings in the central part of the city. Strong Russian units were now massing on the N. bank of the Spree for an assault on the administrative dist. of Berlin. Berlin was now shaken to its foundations by allied bombing and Russian shelling and Ger. artillery fire. It had become a city of cellar or cave-dwellers. In the centre fanatics continued their futile resistance—remnants of the Ninth Army, members of the Schutzstaffel, Hitler's personal guards—sev. divs. strong and lacking nothing in ammunition and weapons. On May 1 the Red Army, hoping to be able to celebrate the day with the full capture of Berlin, turned every gun and mortar they could muster on to the small area into which the Gers. had now been compressed. Dive-bombers and Stormoviks added to the fury. Tanks and mobile guns, which crossed the Spree in the teeth of strong opposition three days previously to lead the attack on the Reichstag building, were now in great force in the Tiergarten. The fire of the Ger. artillery at length began to slacken. The important dists. of Charlottenburg and Schoenberg were cleared the same day. In the midst of this conflict it was announced on the Ger. wireless that Hitler had fallen at his post in the Reich chancellery 'fighting to his last breath against Bolshevism' (May 1) and also that Adm. Dönitz (g.v.) was his successor. It was at this very moment that Himmler (g.v.) had offered immediate unconditional surrender to America and Britain and was expected to follow up his offer by including Russia. Dönitz, however, describing himself as head of the State and commander-in-chief, said that he would continue the struggle 'to save the German people from destruction by the Bolsheviks.'

Meanwhile during this struggle for Berlin other Russian armies were continuing their rapid advance westward. N.W. of Dresden Konev's forces crossed the Elbe on April 25 and, the same day, Vassilievsky's troops at last captured Pillau, large port and naval base on the Baltic. Next day Rokossovsky, after new crossings of the Oder, captured Stettin, the Pomeranian cap., together with many other smaller tns. Prenzlau, 30 m. S.W. of Stettin, fell to Rokossovsky the following day.

It had now for some time been obvious that the W. and Russian Allies would soon meet in Germany and accordingly military arrangements were made for that contingency to be fulfilled without confusion. The actual joining hands

took place on April 27 on the Elbe in the area of Torgau, N.E. of Leipzig and the significance of the juncture was that Germany had now been cut in two. In the S., troops of Eremenko's Fourth Ukrainian Front carried by storm the tn. of Moravská Ostrava, the important Czech industrial centre standing at the entrance to the famous strategic Moravian Gap. (April 30). Next day Russian captures included Stralsund and Brandenburg (cap. of the prov). In the four months ended April 30 or since the opening in Jan. of the final Russian offensive the Gers. lost on the E. front more than 800,000 officers and men in prisoners and about 1,000,000 in killed. During that period the Red Army had captured or destroyed 6,000 Ger. aeroplanes, 1200 tanks and self-propelled guns and more than 23,000 other guns.

Berlin Surrendered.—Fall of Pilsen and Surrender of Breslau and Dresden.—German Capitulation on the Eastern Front.—Liberation of Prague.—The garrison of Berlin surrendered on May 2. Over 100,000 prisoners were taken on that and next day. The destruction of the encircled Ger. groups S.E. of the city was completed the same day. During the battles for Berlin in the previous week Ger. killed numbered 60,000. All through the night of May 2, in the glare of searchlights, columns of Ger. prisoners streamed from the centre of the devastated cap. towards camps on the periphery. Great numbers were half-crazed by the ordeal of shelling and bombing through which they had passed. Shaggy-haired, bearded and grimy they emerged, wearing white armlets, from bunkers, tube-stations, drain-pipes and piles of ruins. Hitler, it was stated by the Gers., had fallen among the defenders. The battles for Berlin had lasted for 17 days and the capture of the city, synchronising with the vast surrenders to Field-Marshal Alexander and Montgomery (see ITALIAN FRONT; WESTERN FRONT) heralded the virtual end of the war in Europe.

But there still remained a number of pockets of resistance, including the Bohemian fortress. Gen. Eremenko, advancing along the E. approaches, took the strong bastion of Teschen on May 3. His group of armies, which till then had been handicapped by the difficulties of fighting on a front riven by formidable mt. ranges, had now reached more favourable terrain. The fall of Teschen, on the Czech-Polish border marked the breakdown of Ger. resistance between Opava and the W. Beskids and cleared the way for a general advance through the famous Moravian Gate. As late as May 6 the Gers. were still putting up stiff resistance in Moravia to the Russian forces of Gen. Eremenko and Marshal Malinovsky. The general advance towards the important tn. and bastion of Olomouc, however, was in full swing. In the N., Rokossovsky took the ls. of Rügen. Elsewhere on the E. Front the operations were marked by the Ger. Army's desperate attempts to disengage in their eagerness to surrender to the Brit. and Amer. forces. In the

region of the Oder estuary they were unable to do so and many prisoners were taken on the Baltic coast, where Swinemünde and Peenemünde were among the last Ger. tns. taken by the Russians in the war. There was bitter street fighting in Prague, but confusion was fast spreading among the Ger. troops, for while some were giving up and being disarmed, others went on fighting and yet others remained in barracks. Allied divisions were fast approaching the city. Gen. Patton approaching from the S.W. near Pilsen and the Russians from the E., but over a hundred miles away, Gen. Patton's tanks rolled into Pilsen early on May 6, the population openly singing the Czech national anthem for the first time for six years. When the tanks first came in Ger. snipers fired under cover of white flags, and street battles between Czech patriots and Ger. snipers continued for some hrs. in the centre of the city. The next day Lieut.-Gen. Majewski, commander of the Ger. garrison of Pilsen shot himself after surrendering with his staff to the Amer. forces. The great Skoda works, which had been at a standstill for some time, were found to have been two-fifths destroyed by allied bombing. There was a citizens' revolt in Prague, and the Czech National Committee issued broadcast appeals for speedy allied help against some 300 tanks which the Gers. were believed to have at their command. Breslau surrendered at last, to Marshal Konev, on May 7, over 40,000 Gers. being captured. The city had sustained a siege of 82 days. It was completely invested on Feb. 14 and since then it had been crumbling to pieces, block by block, in bitter street fighting. Dresden fell to Konev on the following day being the last tn. of any major importance then still held by Ger. forces. On the same day Eremenko captured Olomouc on the Morava. But apart from fighting in a few isolated little pockets, notably in Czechoslovakia, where Patton's forces were marching to join up with the Russians, the end had come on the E. as on the W. Front. The end of Ger. resistance came on May 9 with the final act of surrender to the Allies. (See WESTERN FRONT IN SECOND WORLD WAR.) This was a repetition of Gen. Jodl's surrender at Rheims to Gen. Eisenhower on May 7, but was now made to all the Allies, including Russia. This act of surrender was signed in Berlin by Field-Marshal Keitel, Adm. Friedeburg and Air Col. Gen. Stumpf and it was an unconditional surrender of all Ger. armed forces on land, at sea and in the air to the Supreme Commander, Allied Expeditionary Force, represented by Air Chief Marshal Tedder, Deputy Supreme Commander of that force and simultaneously to the Supreme High Command of the Red Army, represented by Marshal Zhukov. Gen. Spaatz of the U.S. Air Forces, and Gen. de Latre de Tassigny of the French First Army, signed as witnesses.

There was no need for Patton's forces to continue their advance into Czechoslovakia; for Russian tanks under Gens. Rybalko and Leishenko turned from

Berlin in a swift rush southward on May 3. They crossed the Dresden-Leipzig highway W. of the Elbe, thundered through the so-called Saxon Switzerland and broke into Bohemia in an operation of great audacity. There was hard fighting of very varied nature over rivs., through forests and mt. country, the tanks entering Prague from the N.W. in less than six days from their start, a distance of 150 m. Marshal Konev, commander of the forces which had thus liberated Prague, arrived in the city on May 11. Following this operation the Russian tanks drove S. to Pribram to join hands with other powerful Russian forces crossing S.W. Bohemia. Between May 3-12 nearly 500,000 Ger. prisoners were taken between the Sudeten Mts. and the Austrian Alps.

It is now well-known that Patton was prevented from entering Prague in order to allow Soviets the credit for liberation. But he could have entered 3 days before the Russians, and saved many Czech lives.

See also GREECE, SECOND WORLD WAR CAMPAIGNS IN; NAVAL OPERATIONS IN SECOND WORLD WAR; POLISH CAMPAIGNS IN SECOND WORLD WAR; WESTERN FRONT IN SECOND WORLD WAR.

See I. Ehrenburg, Russia at War, 1943; W. E. D. Allen and P. Muratoff, The Russian Campaigns of 1941-43, 1944, and The Russian Campaigns of 1944-45, 1945; A. Tolstoy, My Country, 1944; E. Snow, Glory and Bondage, 1945; A. Werth, The Year of Stalingrad, 1946; I. S. Isakov, The Red Fleet in the Second World War, 1947; L. M. Chassin, Histoire militaire de la seconde guerre mondiale 1939-45, 1947; T. Plevier, Stalingrad (a novel), Munich, 1947; C. Falls, The Second World War, 1948.

Eastern Question. The, an expression which derived its origin from the problems connected with the existence of a portion of the Ottoman Empire in Europe. The main aspects of the problem were the struggles of the Christian populations in Turkey to regain their lands and rights and the efforts of Russia to obtain free entry into the Mediterranean Sea through Turkish ter. Connected with the latter aspect was the attitude of other European Powers, who had no desire to see Russia gain a strategic advantage which might in the event of war be turned against the countries bordering the Mediterranean Sea. There was also a strong desire in Greece to regain Constantinople, which had been captured by the Turks in 1453. The question became one of first-class importance to European statesmen in 1807, but the Congress of Vienna failed to make Turkey comply with its terms; from which circumstance Russia gained considerable prestige in view of the fact that she had contended that the question was a purely local one, and this failure appeared to confirm that view. In 1850 France raised the question with Turkey regarding the right to protect Catholics in Turkey and the guardianship of the holy places in Palestine. France considered that she still had these rights, but the matter was contested by Russia, who made a similar

claim. No agreement was reached, and the Crimean War resulted. The Serbs had for ages endured much from the Turks, but in 1862 they drove them from Belgrade, a success which, however, only served to intensify the difficulties among the Christians of Herzegovina. This eventually forced them to revolt against Turkish rule in 1875. Afraid of the intervention of the Great European Powers, Turkey made a show of granting certain measures of reform, but as these were proved to be worthless (and in view of the Muslim massacre of the Fr. and Ger. consuls at Salonika in May 1875), the Berlin Note was sent to the Porte requiring it to give guarantees for the execution of the reforms. As, however, Great Britain did not assent to the Note, Turkey believing she had the moral support of the Brit. Gov., took no action. Bulgaria also revolted against Turkey in 1875, but this was quelled by wholesale massacre. In 1877 Russia, Serbia, and Rumania declared war on Turkey, the battles round Plevna being the most notable of this campaign. The allies swept on to Adrianople, and by Feb. 1878 were in sight of Constantinople, when the Brit. Gov., alarmed at their success and apprehensive of its consequences, sent a fleet to defend Constantinople. The war was brought to a close by the Treaty of Berlin, under which Turkey lost much ter. The E. Q. became acute again in 1895, when Turkey embarked on a career of massacre of the Armenians in spite of strong representations from Great Britain and France.

Just before the First World War the Balkan War (q.v.) of 1912-13 brought about certain territorial adjustments which irritated most countries concerned and were one of the contributory causes of the First World War. The E. Q., as such, however, lost its significance after Turkey had lost most of its European ter. *See also TURKEY.* *See E. A. Freeman, Ottoman Power in Europe, 1877; T. Comyn-Platt, The Turk in the Balkans, 1906; J. A. R. Marriot, The Eastern Question, 1917; E. Driault, La Question d'Orient depuis ses origines jusqu'à la paix de Sévres, 1921, and La Question d'Orient 1918-37, 1937; W. Miller, The Ottoman Empire and its successors, 1923.*

Eastern Rumelia, *see* BULGARIA.

East Flanders, prov. of Belgium, with Antwerp to the E., Brulaut to the S.E., and W. Flanders to the S.W. It includes the basin of the Scheldt, and under skilful cultivation yields excellent crops, sugar-beet, flax, and hops especially in the Waes dist., which was once barren marsh. There is a considerable trade in flowers and textile manufs. The chief tns. are Ghent, the cap. (pop. 162,400), the second port of Belgium; St. Nicolas (13,600); and Alost (42,000). The area is 1,147 sq. m. Pop. estimated 1,212,000.

East Friesland (*Ost Friesland*) now forms part of the dist. of Aurich in Hanover, Germany. It is bounded on the N. by the N. Sea, and W. and E. by Holland and Oldenburg respectively. Like W. Friesland it is flat and low, but the waste lands have been reclaimed and the

Frisians live by agriculture as well as by fishing.

East Ham, municipal bor. of S. Essex, England. It adjoins West Ham, and is included in greater London. Pop. 143,000.

East Hampton, township of Suffolk co., New York, U.S.A., in the S.E. of Long Is. It is a favourite summer resort and much frequented by artists and tourists during the season. Silverware is manuf. here. E. H. has many old churches and educational establs. Pop. 2000.

Easthampton, tn. of Hampshire co., Massachusetts, with manufs. of textiles, rubber, thread, and fireproof doors. Pop. 10,300.

East India Company, company founded for the purposes of trading with India and the E. Indies. It received its original charter at the hands of Queen Elizabeth in 1600, and this charter, at first granted for fifteen years, was subsequently granted for ever by James I. Companies for similar purposes had been already formed in the great maritime nations of Europe. It was in fact the monopoly of trade by Dutch E. I. C. which led to the foundation of the Eng. E. I. C. in the year already mentioned. The first governor of the company was Sir Thomas Smythe, and the company early estab. a trade, not only with the stations which it founded on the coasts of India, but with the Far E. as well. The early ventures (usually private ones) of the company were entirely successful, and huge profits were realised. The competition of the Eng. aroused the anger and jealousy of the Dutch and led to many quarrels between them. These culminated in the massacre of Ambogna, when the Dutch captured and ill-treated a number of Eng. traders. The indignity was never forgotten, but for the time the Eng. traders confined their attentions to the mainland of India, leaving the is. to the Dutch. The trade with India led to the building of fine merchant vessels, and the palm of mercantile shipping must be given to the E.I.C. up to the nineteenth century. During the seventeenth century the company began to spread and to gain ter. It built fortresses, raised troops, and gained general recognition, but still in quite a small way. This monopoly was interrupted by the advent of a number of interlopers who, feeling that they had equal rights with the company to trade, did so. The company appealed against the interlopers, but it was held that except by special Act of Parliament all Brit. subjects had the right to trade with India (1694). In 1698 one may say a new E. I. C. sprang into being, when by loan of £2,000,000 to the state, the company was reorganised and reinstituted. Quarrels between the rival companies continued down to the reign of Queen Anne, and the gov. only renewed privileges to the original company after obtaining large grants of money. The company still remained merely a trading concern, and its authority, as stated in the charter of Queen Elizabeth, still held good. But during the eighteenth century the rivalry of France and England extended to India,

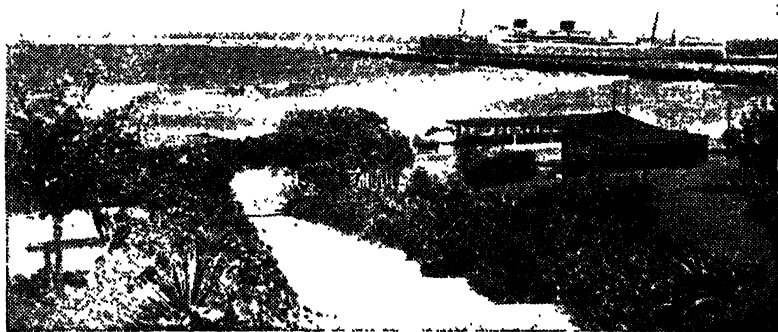
and gradually the company rose, after the victories of Clive, to the position of a ruling power. The company still held unchecked power over its servants and soldiers, until the Regulating Act, 1773, created a governor-general, appointed by the company, but approved of by the Crown. A council of four was also created together with a court of judicature. Pitt's India Bill (1784) created a Board of Control and gave the political, financial and military control into the hands of the gov. Indian policy was no longer a matter for the company but for the gov. Gradually the monopolies of the company were taken away, and the company in this way ceased to be a trading company at all, but merely an administrative body. Finally, after the disaster of the Mutiny (1857), the entire administration of India passed into the hands of the Crown (August 1858). See Florence Bowman and Ether Roper, *Traders*, 1924; W. Foster, *East India House*, 1924; C. Grey, *Merchant Venturers of London*, 1932; C. G. Fawcett, *English Factories in India*, 1936; R. H. Mottram, *Trader's Dream*, 1939; C. Lestock Reid, *Commerce and Conquest*, 1948.

East Indies is opposed in the broadest sense to W. Indies, the name given by early explorers to Is. in the Atlantic which they believed to be off the coast of India. It thus includes India and many groups of Is. in the Pacific. But the name is commonly used of the Malay Archipelago, and especially of the Dutch E. Indies (*q.v.*). This archipelago is the largest cluster of Is. in the world. It lies to the S.E. of Asia, and to the N. and N.W. of Australia, between 95° and 141° E. long., and 6° and 11° S. lat. Borneo—which is larger than the Brit. Isles—the Philippines, Java, Sumatra, and Bali must once have formed part of the Asiatic continent: the shallows about them—nowhere are the surrounding seas deeper than 250 ft.—indicate that they are summits of submerged hills. The investigations of botanists and zoologists all go to prove that the more easterly Is. are closely associated with Australia. It is a curious fact that of the two adjacent volcanic Is. of Bali and Lombok, separated by a narrow but very deep channel, Bali is entirely Asiatic in fauna and flora, Lombok markedly Australasian. In other cases the Asiatic and Australasian characteristics merge in the central Is. and only become marked in those near the continents. Tin, malachite, copper, petroleum, and precious stones are the chief source of mineral wealth. There are many volcanoes, and the soil, as might be expected, is very fertile, yielding sugar, coffee, rice, maize, tea, coconuts, plantains, and spices in plenty. The land is, however, covered, for the most part, in unexploited forest. Java, the most developed of the Is., shows what riches could be produced were they all systematically cultivated. Their natural resources are immense. Java, Sumatra, and Indonesia form part of the Indonesian Union, under the joint sovereignty of the Netherlands and the Indonesian Republic. Parts of Borneo, Timor, and New Guinea are included in the Dutch E. Indies. In 1898

the Philippines were ceded by Spain to the U.S.A. but gained their independence as a republic in 1946; Portugal holds a part of Timor; N. Borneo is a Brit. protectorate, as is Papua, the S.E. part of New Guinea. The N.E. part of that is. was formerly a Ger. possession, but now constitutes, with the Bismarck Archipelago, the Mandated Ter. of New Guinea. The native population includes Papuans or Melanesians and Malays.

See also DUTCH EAST INDIES; BORNEO; INDONESIA; JAVA, etc. See G. T. Raynal, *Histoire Philosophique et politique des établissements et du commerce des européens dans les deux Indes*, 1780; Augusta

to form E. Lancs. Regiment. The 30th was raised in 1702 as Marines, and served at the capture of Gibraltar, 1704; thence in W. Indies, America, and in fleet against Fr. coast. In 1782 it was named 'The Cambridgeshire Regt.', served under Abercromby in Egypt, 1801, and went through Peninsular Campaign with Wellington. It was in the Crimean War, and later went to Canada. The 59th was raised in 1755, and served in the Amer. War of Independence. In 1782 it was called the '2nd Nottinghamshire Regt.', and afterwards took part in Moore's retreat on Corunna, the Peninsular Campaign and the B. of Waterloo. It then



EAST LONDON: A LINER LEAVING THE HARBOUR

de Witt, *Island-India*, 1923; R. Kennedy, *The Ageless Indies*, 1942; B. Lasker, *Peoples of South-East Asia*, 1944; H. Daniel, *Islands of the East Indies*, 1944. East Indies, Dutch, see DUTCH EAST INDIES.

East Kazakhstan, Region of the Kazakh S.S.R., Soviet Central Asia.

East Kent Regiment, see BUFFS.

Eastlake, Sir Charles Lock (1793-1865), Eng. painter, was for some time a pupil of Haydon, a fellow Devonian. He once saw Napoleon, a captive on the *Bellerophon*, in the harbour of his native Plymouth, and later executed a fine life-sized portrait of the emperor largely from sketches made on that occasion. From 1817-30 he lived chiefly in Rome, and became R.A. in 1830. In 1850 he was president of the Royal Academy, and having been appointed director of the National Gallery in 1855, he exerted his influence towards improving the It. schools. In his best work, such as 'Christ lamenting over Jerusalem,' 1843; 'Pilgrims arriving in sight of Rome,' 1828; and 'Byron's Dream,' 1834, it is grace and finish which impress.

East Lancashire Regiment, formerly 30th and 59th regiments, linked in 1881

served in Gibraltar, West Indies, China and Afghanistan. The East Lancashire Regiment served in South African Campaign: raised seventeen battalions during First World War, which served in France, Flanders, Macedonia, Gallipoli, Egypt, and Mesopotamia. In the Second World War the regiment fought on the W. Front and in France. They were engaged in especially heavy fighting in the vicinity of Goch and other tns. in the Rhineland.

Eastland, city of Texas co., seat of E. Co. Centre of oil producing region. Pop. 5000.

Eastleigh and Bishopstoke, two tns. in Hampshire, England. The rolling stock works of the former S. Railway are here. Eastleigh is 2 m. and Bishopstoke 5 m. N.N.E. of Southampton. Pop. of Eastleigh and Bishopstoke 28,000.

East Liverpool, city of Columbiana co., Ohio, U.S.A., on the Ohio R., 44 m. W.N.W. of Pittsburgh by rail. Pottery and earthenware are its chief manufs. Pop. 23,500.

East London, seaport of S.E. Cape Province at the mouth of the Buffalo R. 543 m. by sea from Cape Town, and 253 m. from Durban, 665 m. from Johannesburg

and 1223 m. from Bulawayo. It is the prin. wool port of S. Africa, and has furniture, textile, metal-ware, and food manufs. Its pier is 1289 ft. in length with promenade deck, and the harbour has a turning basin which permits 20,000-ton liners to enter, discharge and load cargoes, and turn about. There are sev. colleges and many schools, and a fine new post office, city hall, and public library. Queen's Park is one of the largest in South Africa and the esplanade one of the finest. The beautiful scenery and excellent bathing make it a popular seaside resort. The site of E. L. was discovered in 1836 by John Baile, an Eng. settler, who reached S. Africa in 1820; and the first steps to founding a settlement there were taken in about 1847 by Capt. Wm. Baker who gave the name of Fort Glamorgan to the place. Pop. (white), 38,300, (coloured), 4,979.

East Lothian, or **Haddingtonshire**, S.E. maritime co. of Scotland, bounded by the frth of Forth and the N. Sea, and the co. of Berwick and Midlothian. Its surface is generally hilly, with the Lamermuir (1500 ft.) in the S., and the scattered peaks of Traprain Law (724 ft.), Berwick Law (612 ft.), and Tarleton Hill (590 ft.). The only important riv. is the Tyne (28 m.). Coal and iron are mined and limestone quarried in various dists., but the chief industries are agric., and the co. has been noted for the richness of its grain and green crops. Fishing is also largely followed. The chief tns. are Haddington, Dunbar, North Berwick, and Prestonpans. The area is 267 sq. m. Pop. 52,500.

East Main, former name of the portion of Labrador peninsula (Hudson Bay Ters.) bounded N. by Hudson Strait, W. by Hudson Bay, S. by Quebec. It is now the Ungava dist. of the dominion of Canada, with a scanty Indian pop.

East and West Malling, two adjoining pars. in Kent, England, in the Medway div. E. Malling is 4 m. W. of Maidstone, and W. Malling 5½ m. W.N.W. The latter has the remains of a Benedictine nunnery founded in 1090. Pop. of rural dist. 38,300.

East Moline, city of Rock Is. co., Illinois, U.S.A., on the Mississippi R., with important manufs. Pop. 12,300.

Easton: (1) Cap. of Northampton co., Pennsylvania, U.S.A., on Delaware R., above the rapids, at the confluence of Lehigh R., about 60 m. from Philadelphia. It is on various railways, and connected with New Jersey and South E. by bridges. The fine public buildings include Lafayette College (Presbyterian, 1826). There are important and various manufs., including steel, cement, slate, silk, doors, pianos, fire-escapes, furniture, pumps, dental supplies, and machinery. The bell rung to summon the people to hear the Declaration of Independence still hangs in the court house. Pop. 33,500. (2) Tn. of Bristol co., Massachusetts, U.S.A., 9 m. from Taunton. There are iron foundries and manufs. of automobiles, shovels, and wire goods. Pop. 5,100.

East Orange, city of Essex co., New

Jersey, U.S.A., adjoining Newark, 12 m. from New York, of which it forms a suburb. It has wide, well shaded streets and many attractive houses. There are electrical works and manufs. of pharmaceutical supplies. Pop. 68,900. See Whittmore, *The Founders and Builders of the Oranges*, 1896.

East Palestine, city of Columbiana co., Ohio, U.S.A., manufs. automobile tyres, china wares, etc. Pop. 5,100.

East Pittsburgh, bor. of Allegheny co., Pennsylvania, U.S.A., 12 m. S.E. of Pittsburgh. Manufs. electrical apparatus. Pop. 6000.

East Point, suburb of Atlanta, Georgia, U.S.A. Pop. 12,400.

Eastport, city and port of entry of Washington co., Maine, U.S.A., on Moose Is. in Passamaquoddy Bay. It is on the U.S. eastern frontier; Fort Sullivan defends the harbour. Fishing and lumber trade are the chief industries, and it has sardine canning establs. Pop. 3,900.

East Providence, tn. and post vil. of Providence co., Rhode Is., U.S.A., separated from Providence by the Secok (Blackstone) R., on Narragansett Bay. It is a summer resort. Oysters are shipped and there are chemical, paper, and electric works, and a bleachery. Pop. 32,100.

East Prussia, formerly the detached easternmost prov. of the Free State of Prussia, Germany, with an area in 1939 of 15,043 sq. m. and a pop. of 2,280,000. It is now divided between Russia, as part of the R.S.F.S.R. and Poland, known as Masuria. Its pre-war cap. was Königsberg, renamed Kaliningrad in 1946. Other chief tns. are Tilsit, Insterburg, Elbing (Elbląg), Braunsberg (Braniewo), Allenstein (Olsztyn), Gumbinnen Osterode, and Marienburg (Malbork). Oats, rye, potatoes and flax were the chief products and horses and cattle were bred; there was much fishing, and amber was found in some localities. A large part of E. P. is forest, moor and bog, and wolves and lynxes still survive. Unprejudiced examination does not bear out the tradition that E. P. was the home of 'Prussianism' or the *fons et origo* of Ger. militarism. It was a typical Eastern Ger. prov., with great estates rather less predominant than elsewhere, and like all Germany E. of the Elbe it was colonial land or land reconquered in the last six hundred years from the Slavs. But unlike the 'march' lands won back by secular princes, E. P. was the relic of a crusading order, the Teutonic Knights, who, in the early fifteenth century, were finally defeated by the Poles at the great battle of Tannenberg (q.v.), and their ter. reduced to the land round their two great crusading castles Marienburg and Königsberg or roughly the modern ter. of E. P. It is sometimes thought that the crusading militarism of the Teutonic Knights was the source of Ger. ruthlessness in war, but the theory has no warranty in hist. In the seventeenth century the landowners of E. P., far from manifesting a habit of militant servility, pursued a constitutional struggle with the Elector of Bran-

denburg. In the nineteenth century, far from aiding the Prussian militarists to dominate Germany, E. P. took the lead against them and the liberals of the Prussian Parliament who resisted Bismarck's unconstitutional system were largely unrepresentatives of E. Prussian rural constituencies. In fact the Ger. farmers and traders from E. P. showed the rough independence and courage which not seldom characterise a colonial people. Later the Junker landowners and liberal farmers composed their differences and united in an agrarian organisation known as the Landbund. In the nineteenth century E. P. was not notably or aggressively nationalistic in the conflict with the Poles, and in fact produced the few Ger. radicals who wanted to co-operate with the Poles in a common war of liberation against Russian Tsardom. After 1919 when W. Prussia and Pomerania were incorporated in Poland, E. P. became the isolated advanced post of Ger. nationality in E. Europe for the first time since the awakening of national consciousness, and its frontier nationalism tended to be magnified as a symbol of the national struggle, mainly by the propagandist immigrants rather than by the E. Prussians themselves. No doubt some of the Prussian military families came from E. P. but they are scattered all over Germany E. of the Elbe and few have an exclusively E. Prussian origin. Depriving Germany of E. P. or even of a great part of it spares her the strategic problem of defending an isolated prov. besides reversing a Ger. advance at Slav expense sev. centuries ago, but it involves also the difficulty of shifting a great number of Gers. to other parts of the country.

In the First World War the Russians advanced into E. P. in 1914 as far as Allenstein when Hindenburg routed them in the region of the Masurian Lakes at the Second great Battle of Tannenberg (Aug. 26-30, 1914). By the treaty of Versailles (1919) a part of E. P. was ceded to Poland. In the Second World War, the Russian armies invaded E. P. in January, 1945. Marshal Rokossovsky advancing northward against the prov. while simultaneously Gen. Tcherniakovsky attacked from the E. By Jan. 21 Tilsit, Insterburg, Allenstein, and Tannenberg had been taken and a few days later Rokossovsky's forces had advanced to the Gulf of Danzig. On April 9 the Russians took Königsberg. (See under EASTERN FRONT OR RUSSO-GERMAN CAMPAIGNS IN SECOND WORLD WAR.) After the defeat of Germany the Berlin or Potsdam Conference (July 17-Aug. 2, 1945) agreed, on the proposal of the U.S.S.R., that, pending the final determination of ter. questions at the peace settlement, the section of the W. frontier of Russia which is adjacent to the Baltic should pass from a point on the E. shore of the Bay of Danzig to the E. N. of Braunsberg-Goldap, to the meeting-point of the frontiers of Lithuania, Poland, and E. P. It was also agreed that ultimately the city of Königsberg and the area adjacent to it as described above should be transferred to Russia. The

transferred portion includes the Kurisches Haff, Gumbinnen, Tilsit and Insterburg, but excludes Elbing, Braunsberg, Allenstein, Osterode and Marienburg, all of which were included in that part of E. P. which was assigned to Poland.

E. P. has now completely lost its old identity on the map. Its N. third—including Memel and Königsberg—is now part of the R.S.F.S.R.; the rest, some 14,000 sq. m., is part of Poland, where it does not even constitute a separate prov. By 1917 some 300 collective farms had been set up in Russian E. P., and 50,000 Ukrainians settled there; cattle are bred, but only oats and potatoes are grown. The cities suffered widespread destruction, but there are some paper mills and the port of Königsberg (Kalinograd) has been largely restored as Russia's only ice-free port in the Baltic. Poland's share of E. P. consists largely of agric. land, often poor. Under German ownership before the war E. P. was maintained as a grain-growing country only with the aid of high protective tariffs and gov. subsidies. The soil is so lacking in good qualities that, even if the Poles had all the necessary fertilisers, they would not spend them on E. P. Compared with the remarkable progress of the W. part of Poland's recovered ter., the process of transforming E. P. from a Ger. into a Polish prov. is slow. On the battlefield of Tannenberg, in Polish E. P., still stand the ruins of the gigantic eight-tower Ger. memorial; around the ruins in 1947 mostly untilled fields. Many of the tns. and vlds. around here were completely destroyed in the war, and some tns. were burned down by the Russians as an act of revenge—not realising that the prov. would never again be Ger. soil. Moreover, the fighting in E. P. throughout the winter of 1944-45 was exceptionally ferocious; no country was better adapted for defence than E. P., with its large forests and its network of lakes and canals, its mills and ravines and its solid farm buildings of stone and brick. With the exception of Olsztyn, most of the larger cities and notably Marienburg and Elbing are still (1949) in ruins. In the Olsztyn area, with a pre-war pop. of 800,000, over 600,000 Poles have already been settled some being autochthonic Poles, who despite Bismarck's Germanisation policy retained their traditional characteristics. Some 10,000 are Gers. allowed to stay in E. P. on declaring loyalty to Poland. Most of the land in Polish E. P. had been brought under cultivation by mid 1918, while some of the fallow land (which totals about 20 per cent) is scheduled for afforestation. Owing to its military traditions E. P. had few industries and these few were almost all destroyed together with the tns. in which they were located. By 1948 sev. brick, china, textile, and other factories had been rebuilt. Plans have been made for a cellulose factory in the Olsztyn dist. and for dockyards in Kiblag, whose submarine plant was removed to Russia. There is much activity in the restoration of saw-mills, and special schemes are under way to utilise the large timber resources for furniture making. The large and beau-

tiful Masurian Lakes provide the best fish-breeding centres in all Poland. The roads are probably the best in Poland to-day. Almost all the bridges destroyed in the war had been repaired by 1948, and railways restored to operation. The many military barracks, which were so forbidding a feature of the pre-war prov., have been converted into schools and homes for the labouring classes. Throughout the regained ters. there are numerous traces of a former bond with Poland and the Poles. This is evident in the cathedral of Allenstein (Olsztyn) and the churches in Elblag, Malborg, and Frombork (Fravenburg). Most of the castles are in ruins but their walls still bear the names of their Polish builders or owners under Polish kings of old. The famous Gothic castle of the Teutonic Knights in Malborg is practically in ruins, together with the cathedral and the city of Malborg itself. Attempts are being made (1949) to preserve what remains of Malborg castle and of other historic buildings in E. P. In Olsztyn castle, which is undamaged, there is still to be seen the chamber where Copernicus lived and worked between 1516 and 1521, he then being canon and administrator of the dist. on behalf of his uncle, the bishop of Ermland. Some 50 m. farther N. at Frombork, a small township completely ruined by the war, is the house in which Copernicus lived and the cathedral where he was buried. Facing the gate of the cathedral is the tower 70 ft. high from which he studied astrophysics and here he wrote his *De revolutionibus orbium coelestium* on the heliocentric theory of the universe. The cathedral, an austere-looking Gothic structure, was spared in the war, but no trace of the remains of Copernicus has yet been found. See T. A. R. Marriott and Sir C. G. Robertson, *The Evolution of Prussia*, 1915; C. von Lörck, *Herrenhauser Ospreussens*, 1933; W. Franz, *Geschichte der Stadt Königsberg*, 1934; S. Srokowski, *East Prussia*, 1934; J. A. Wilder, *The Economic Decline of East Prussia*, 1937.

East River, strait connecting New York Harbour with Long Is. Sound, E. of New York City, U.S.A. It is 15 m. long, $\frac{1}{2}$ to $\frac{3}{4}$ m. wide. By its N. arm (Harlem R.) and Spuyten Duyvil Creek it is connected with the Hudson R. It separates the bors. of Manhattan and the Bronx (W. and N.) from those of Brooklyn and Queens (E. and S.). Among its is. are Blackwell's, Randall's, Ward's, and Riker's. The channel at Hell Gate (between Ward's and Long Is.) has been made navigable by blasting the rock. Brooklyn, Williamsburg, and two other suspension bridges span the E. R.

East Saginaw, see SAGINAW.

East St. Louis, city of St. Clair co., Illinois, U.S.A., on Mississippi R., opposite St. Louis, connected with it by steel bridges. It is an important railway terminus, has large stockyards, mule and horse markets, mills, railway car construction, and the manuf. of iron and steel products, food preparations, baking powder, glass, paints and refined petroleum. Pop. 75,000.

East Surrey Regiment, see SURREY REGIMENT, EAST.

Eastwood, par. and urban dist. of Nottinghamshire, England, about $8\frac{1}{2}$ m. from Nottingham, with coal mines. Pop. 5000.

East Yorkshire Regiment, see YORKSHIRE REGIMENT, EAST.

Eaton, Arthur Wentworth Hamilton (1849-1937), Canadian writer; b. in Kentville, Nova Scotia; eldest child of Wm. E., schoolmaster and school-inspector. He graduated from Harvard in 1880, entered the episcopal ministry, and was rector of St. Andrew's Church, Chestnut Hill, Massachusetts, 1885-87. He was the author of: *The Heart of the Creeds and Historical Religion in the Light of Modern Thought* (1888), *Acadian Legends and Lyrics* (1889), *Tales of a Garrison Town* (with C. L. Betts 1892), *College Requirements in English* (1900), *The Lotus of the Nile and other Poems* (1907), *The History of King's County, Nova Scotia, Heart of the Acadian Land* (1910), *The Famous Mather Byles* (1914), *The Eaton Family of Nova Scotia* (1929), and *Acadian Ballads and Lyrics in Many Moods* (1930).

Eaton, Herbert Francis, see CHEYLES-MORRE, BARON.

Eaton, Long, see LONG EATON.

Eaton, Margaret O'Neill (1796-1879), 'Peony O'Neill'; daughter of Wm. O'Neill, who kept a tavern in Washington, D.C. About 1823 she married John B. Timberlake, purser in the navy, who committed suicide in 1828 in the Mediterranean. In Jan. 1829 she married John Henry Eaton—appointed secretary of war that year. It was reported that she had had relations with Eaton while Timberlake lived. Wives of Cabinet Ministers refused to recognise her. President Jackson on this account reconstructed his Cabinet, favouring Van Buren who was friendly towards Mrs. Eaton. She was popular in Madrid society when her husband was ambas. in Spain 1836-40. Her husband dying in 1856, she next year married Antonio Buchignam, an It. aged about twenty. He squandered her money, and was separated from her.

Eaton Socon, vil. of N.E. Bedfordshire, England, on the R. Ouse 2 m. S.E. of St. Neots, Huntingdonshire. It is noted for its fourteenth-century par. church of St. Mary the Virgin, which was almost totally destroyed by fire in 1930. By 1932, the building was restored to its original form by vil. craftsmen, a remarkable re-creation of medieval Gothic, recalling the finest work of the medieval guilds. Dedicated by the bishop of St. Albans, June 25, 1932.

Eaton, Theophilus (c. 1590-1658), Eng. colonial governor, son of an Eng. clergyman. Educated in Coventry, where he formed an enduring friendship with John Davenport, the Puritan divine, through whom, later, he was influenced to settle in New England. Prior to migrating he had a successful mercantile career under the East Land Company who made him their 'deputy governor' or representative in N. Europe. Following the religious

persecutions in England, he accompanied Davenport to Holland and thence went to America and interested himself in settlement. He became governor of New Haven, and was active in procuring the charter for Massachusetts in 1629. His administration was, however, embittered by the disputes between Eng. and Dutch colonists.

Eau Claire, city of N.W. Wisconsin, co. seat of Eau Claire co., with many manufs. including paper mills, a state teachers' college, tuberculosis hospital, hospital for the insane, and a municipal auditorium seating 2000: 300 acs. of parks, with boating and fishing. Pop. 30,700.

Eau Cr  le, a fine Fr. liqueur made in Martinique by distilling the flowers of the W. Indian wild apricot or mannee apple (*Mammea Americana*) with pure spirit of wine.

Eau de Cologne, celebrated perfume, probably invented by Johann Maria Farina (1685-1766), who came from N. Italy and settled in Cologne (1709). Some forty firms at Cologne bearing the name of Farina claim to possess the original recipe for its manuf. The main ingredients are pure distilled alcohol and various essential aromatic oils (neroli, orange, rosemary, citron, bergamot), so blended as to yield a refreshing odour. It relieves headaches, and is very occasionally taken as a stimulant.

Eau de Javelle, one of the earliest bleaching solutions obtained, so called because first made at Javelle, near Paris. It is a poisonous solution of hypochlorite of potash, used as an antiseptic and to remove stains from muslin, linen, and white marble. It is usually adulterated with bicarbonate of potash.

Eaux-Bonnes, health resort of Basses-Pyr  nes, France, about 3 m. from Laruns. There are seven warm medicinal springs used for drinking, especially in cases of diseases of the respiratory organs and rheumatism. It was a favourite resort of the Empress Eug  nie. Pop. 450.

Eaux-Chaudes, or **Aigues-Chaudes**, com. and watering-place of Basses-Pyr  nes, France, 3 m. from Eaux-Bonnes. It is in the gorge of the Gave d'Ossau, at the foot of the Pic du Midi d'Ossau (about 9500 ft.). Its warm sulphur springs are much used for bathing. Pop. 220.

Eavesdrip, or **Eavesdropping**, literally the dripping of water from the eaves of a building. The term is chiefly used in connection with the A.-S. custom preventing any one from erecting a house at the extremity of his estate, lest the eavesdrip should injure his neighbour's land. This custom corresponded to the *stillicidium* or urban servitude of the Romans. The right to permit rain-water to fall from one's roof upon a neighbour's ground is in the nature of an easement (*q.v.*). In a derivative sense, eavesdropping means loitering about to overhear private matter with intent to repeat it.

Ebbesfleet, hamlet on the I. of Thanet, Kent, England, about   m. from Pegwell Bay. The Saxons are supposed to have landed here under Hengist in 449. It was also the landing-place of St. Augustine (597).

Ebbw Vale, urban dist. in the co. of Monmouth, England, containing the works and collieries of the E. V. Steel, Iron and Coal Co., with a pop. of 31,700.

Ebeling, **Christopher Daniel** (1741-1817), Ger. man of letters, was prof. of hist. and Gr. at the gymnasium of Hamburg and chief librarian in that city for over twenty years. He lavished his best years on a voluminous *Geography and History of the United States of North America* (1777), a work which earned for him the public thanks of Congress.

Ebenaceae, a natural order of tropical Dicotyledons, consisting of about 300 trees and shrubs. The inflorescence is solitary or cymose, and the flowers are usually dioecious.

Ebenezer (Heb., stone of help), name of the monument which Samuel raised to God after the victory of the Israelites over the Philistines (see 1 Sam. vii. 12). The site is not exactly known, but is thought to be near modern Deir Aban.

Eberhard I. im Bart (1445-96), Duke of W  rttemberg, succeeded his elder brother, Louis II. duke of W  rttemberg-Urach, in 1457. He lived a careless, dissolute life till 1468, when he went on a pilgrimage to Rome, and on his return proved himself to be a capable ruler. In 1482, by the treaty of M  nsingen, he brought about the reunion of Stuttgart and Urach, and granted to W  rttemberg its first constitution in 1492. He was raised to the rank of duke by Maximilian I. in 1495. He founded the Univ. of T  bingen (1476), and was a patron of scholars. See lives by W. Zimmermann, 1832, and A. Bosserst, 1884.

Eberhard, **Christian August Gottlob** (1769-1845), Ger. writer, who is now only remembered by his *Hannchen und die K  chlein* (1822), a long narrative poem, and *Der Erste Mensch und die Erde* (1828), an epic poem on the Creation written in hexameters.

Eberhard, **Johann Augustus** (1739-1809), Ger. philosophical and theological writer, b. at Halberstadt. His first work, *Neue Apologie des Sokrates* (1772), advocated a broader theological outlook towards those who have not accepted the tenets of Christianity. His prin. works are: *Amyntor, eine Geschichte in Briefen* (1782); *Versuch einer allgemeinen Deutschen Synonymik* (1795-1802); and *Handbuch der   sthetik* (1803-05). See study by F. Nicolai, 1810.

Ebers, **Georg Moritz** (1837-98), Ger. Egyptologist and novelist, b. in Berlin. He became lecturer of Egyptian at Jena (1865), and prof. at Leipzig (1870). The famous Papyrus Ebers, which he discovered during his travels, was pub. in 1874. He also wrote *  gypten und die B  cher Moses* (1868), and *  gypten in Wort und Bild*, a descriptive work (1878). In 1876 he resigned his professorship through ill-health, and began a series of instructive historical novels with the object of popularising Egyptian lore. The chief of these are: *Uarda* (1877), *Der Kaiser* (1881), *Serapis* (1885), and *Kleopatra* (1894). Many of his tales have been trans. into Eng. His *Gesammelte Werke* were pub. in 25 vols.

(1893-95). See his *Die Geschichte meines Lebens*, 1893, and a study by R. Gosche, 1887.

Ebersbach, tn. in Saxony, Germany, 14 m. S.S.W. of Bautzen, with one of the finest organs in Saxony. Pop. 9500.

Eberwalde, tn. of Germany, 28 m. N.E. of Berlin, has a fourteenth-century church, remains of tn. walls, school of forestry, iron foundries, rope works, etc. In 1913 one of the largest treasures of prehistoric gold objects in Germany was discovered here (1050-850 B.C.) and presented to the state museum for pre-hist. at Berlin. Pop. 30,000.

Ebert, Friedrich (1871-1925), first president of the Ger. republic; b. at Heidelberg; son of a poor Catholic tailor. He was apprenticed to a saddler in his native city at the age of fourteen. He became a travelling journeyman saddler, and helped to found a saddlers' union. Married and settled in Bremen. In 1894 he became editor of the Bremen *Bürgerzeitung*, a socialist paper which he gave up to become secretary of the Bremen branch of the party. For a while he kept an inn. He unsuccessfully contested the Hanover dist., 1905. In 1912 he was elected for Eberfeld-Barmen—a seat his party had lost in 1907, and in the following year was elected president of the party in succession to Bebel. He supported the gov.'s demand for war-credits in 1914, in view of the Russian danger. He was at the Socialist Peace Conference at Stockholm, 1917. When the overthrow of Kaiserism was seen to be inevitable in 1918, and when Prince Max of Baden called in the Socialists to share the gov., E. was in favour of a limited monarchy. When Scheidemann had proclaimed the republic, Prince Max commissioned E., as chancellor, to form a gov. He was violently attacked by minority Socialists for insisting on constitutional procedure; and in Jan. 1919 he made a display of force against them in Berlin. On Feb. 10 the National Assembly at Weimar made him President. He reaffirmed his socialism—which, in his case, was coupled with agnosticism. After the Kapp 'putsch' had been defeated, E. put forward, in June 1920, a request that the presidency should be regulated according to the Constitution, which required popular election. He renewed this request in 1921; but the Reichstag passed a resolution permitting him to retain office till 1925. He was much overworked, and died in West Charlottenburg sanatorium, Feb. 28, 1925. He was of very striking appearance—not much above middle height, stout, bull-necked, with prominent eyes and angular eyebrows; an impetuous speaker, yet always trying to follow the rule of common-sense.

Ebert, John Arnold (1728-95), Ger. poet. As a translator, whether the work were Young's *Night Thoughts* or Gk. epigrams, he was eminently successful, but in his own poetry his deficiency in original force is at once apparent. His compositions include drinking songs, lyrics, epistles, and some much-admired epigrams. A representative of the school of Saxe, he

faintly recalls Horace and Anacreon in his pictures of rural scenes and praise of simple pleasures.

Ebingen, tn. of Württemberg, Germany, on the Schmiecha, a trib. of the Danube, 21 m. S. of Tübingen, with textile manufs. Pop. 14,200.

Eblonites (Heb. *ebion*, poor man), name probably applied at first to all Christians, later used particularly of an ultra-Jewish party who, though Christians, remained outside the Catholic Church. Their gospel was a form of that known as the Gospel according to the Hebs.; they strictly adhered to all the customs and ordinances of Mosaic law, thus regarding Paul as an apostate whose epistles they rejected; and some of them did not believe in the miraculous birth of Jesus Christ. The chief authorities as to their early history are Irenaeus, Hippolytus, Origen, and Justin. Those who lived E. of the Jordan held Essene doctrines, which gave rise to the 'Clementine' literature.

Eblis, or *Iblis*, of Muslim demonology, a fallen angel (*Azazil*), who attained the characteristics of the devil, and became chief of the Jinn.

Eboli (*Evoli*), tn. in the Campagna dist., Italy, 13 m. from Salerno, with a commanding view over land and sea. Has an ant. castle of the Princes of Angri, and between the tn. and the Sele riv. are the ruins of the ant. *Eburi*. A fine Roman bridge spans the riv. The tn., together with the Battipaglia, suffered much damage during the Salerno landings of 1943. The roof of the nave of the Church of St. Francis of Assisi collapsed; and the Church of San Giovanni dei Greci was destroyed. Pop. 20,000.

Ebonite, see RUBBER.

Ebony (Gk. *ἔβνος*, Lat. *ebenum*), an extremely hard wood of various species of the genus *Diospyros* (order Ebenaceae), the genus of the Date Plum and allied genera. The best quality is deep black in colour, consists of heart wood only, and is very durable. It is yielded by *D. Ebenum*, a tree that flourishes in S. India and Ceylon. Various kinds of E. are procured from *D. tomentosa* in Bengal, *Brya ebenus* in the W. Indies, *D. dendo* in Angola, and *Dalbergia melanocorylon* in Senegal.

Ebony Heart, tree of Queensland, Australia. The *Elaeagnus laurosticta*, belonging to the order Tiliaceae, gives a hard enduring wood, somewhat like lignum vitae and used for much the same purposes. Yields a fruit resembling a plum, which is used for food.

Ebra, see EVORA.

Eboracum, see YORK.

Ebrides, see HEBRIDES.

Ebro (Lat. *Hiberus*), riv. of Spain which rises at Fuentibre in the prov. of Santander and flows into the Mediterranean Sea. Its chief tribs. are the Ega, Aragon, Gallego, and Segre on the l. b., and the Jalon, Martin, Guadalupe, and Matarrifa on the r. b. The prin. cities on its banks are Logroño, Calahorra, Tudela, Saragossa, Mora, and Tortosa. It is navigable for small vessels from Logroño, but navigation is difficult, for the riv. is

blocked with sand and its course obstructed by many rapids. Length, 470 m.; area of basin, 32,000 sq. m.

Ebsambui, *see* IPSAMBUL.

Ebullition (boiling of fluids), *see* under FLUID.

Eburi, *see* EBOLI.

Ecbatana, or Agbatana (Heb. *Ach-melha*), cap. of anct. Media, founded according to Herodotus by Darius (about 700 B.C.). It was captured by Cyrus (549 B.C.), and became the seat of gov. and the favourite summer residence of Persian and Parthian kings. It was surrounded by seven walls, within which lay the royal castle, built of cedar and cypress wood, covered with gold and silver. The city was plundered by Alexander the Great and Seleucus I. The modern Hamadan is built on its site.

diseases of the blood and blood-vessels. A fresh E. has the appearance of a group of pin-pricks.

Ecclefechan, vil. of Dumfriesshire, Scotland, 5 m. N. of Annan. Thomas Carlyle, who was born and buried here, introduces it into *Sartor Resartus* under the name 'Entepfuhl.' Pop. 610.

Eccles, municipal bor. of Lancashire, England, and a suburb of Manchester. It was incorporated in 1892. There are engineering works, cotton mills, and manufs. of ginghams and fustian goods. E. cakes take their name from the neighbourhood, where they are largely made. Pop. 45,000.

Ecclesfield, civil and eccles. par. partly included in the bor. of Sheffield, England. There are large collieries and iron and steel works, and manufs. of cutlery and



THE EBRO AT LOGROÑO

Ecce Homo (Lat., 'Behold the Man'), the title given to pictures representing Christ crowned with thorns. One, by Correggio, hangs in the National Gallery, London, and one of the best known of such pictures is a Titian of 1543, belonging to the Imperial Gallery at Vienna.

Eccentric, a contrivance for taking an alternating rectilinear motion from a revolving shaft, and consists of a disc connected eccentrically with regard to the shaft, which in rotating carries the disc with it in a circular movement, thereby actuating a connecting rod and giving it a regular to and fro motion. The distance between the centre of the shaft and that of the disc is called the 'throw,' and is one half of the resultant rectilinear motion.

Eccentric Club, social club (founded in 1890), 11 Ryder St., London, S.W. 1. Drama and the arts are discussed especially.

Eccentricity, *see* under CONIC SECTIONS.

Echymosis, or Bruise, a discoloration of the surface of the skin, caused by an effusion of blood below. It occurs as a result from a blow or violence of some kind, but sometimes it is met with in

nails. Pop. of civil par. 22,944, of eccles. 6000.

Ecclesia (Gk. *ἐκκλησία*, from *ἐκ*, out, and *καλεῖν*, to call), the name given to the general assembly of all freemen of the state in Athens. After the reforms of Cleisthenes, it was known as the E. when it met for political purposes, and 'Hellas' when it had judicial business in hand. It is not thought that the E. had any definite form before the time of Solon, though some such institution was doubtless in existence. The reforms of Solon are not known exactly, but there is no doubt as to their general effect, which was to give the Thetes, the lowest class, a voice in the E., and the power of criticising and exercising some check over the actions of the Eupatrids, the governing class. All citizens of Athens over eighteen years of age were eligible to appear in the E., save those who had for any reason suffered loss of civil rights. The meetings were of three kinds, ordinary, extraordinary, and those convened by special messengers; the last were held only when the attendance of the country members was desired. The proceedings were opened by various religious formalities, and if the omens were unpropitious, or the weather was bad, no

meeting was held. The voting was as a rule by show of hands, or, on special occasions by ballot. The practice of payment for attendance was instituted some time in the fourth century B.C. The E. was the sovereign power in Athens throughout the time of her greatness, though being an untrained body it could not initiate laws; this was done by a committee of the Boule (*q.v.*). In 308 B.C. Demetrius of Phalerum curtailed the power of the E. by instituting Guardians, who could prevent it from voting on an illegal motion. As a governing body the E. perished when Athens became a *civitas libera* of Rome.

Ecclesiastes ('the Preacher'). This is one of the O.T. books (Heb. *qobeleth*), the fourth of the five Megilloth in the ordinary Heb. Bible. The Gk. title, from which the Eng. is derived, means 'a member of assembly'; the Heb. has occasioned some discussion, as it only appears in this book, and seems to mean the 'herald' who summons an assembly. On the whole, Luther's trans., followed by the Eng. version, is fairly satisfactory, the purpose of the book is hortatory, and the form of the word implies an assembly; the trans. *der Prediger* ('the Preacher') combines the two ideas.

Scope and contents.—A similar literary form was adopted by Browning in *The Ring and the Book*, a monologue which conceals a real dialogue. In matter it is the narrative of a series of speculations and spiritual experiments of the 'highest good.' It is proved that if the individual makes it his aim to attain merely and solely his own personal happiness, whatever the sphere be in which he makes the attempt, the result is 'Vanity of vanities, all is vanity.' The epilogue is the necessary conclusion of the whole matter. 'Fear God and keep his commandments, for this is the whole duty of man'; not pleasure, but duty, is man to make his purpose of life.

Language.—The Heb. of E. is unlike that of any other portion of the O.T. No other book has so large a proportion of words, phrases, and senses of words peculiar to itself. In its vocabulary and many of its constructions, it is related to the 'Mishna.' We need only remark on the preference for the short relative, the rare use of the 'vav,' 'conversive,' and avoidance of the sign of the accusative. At the same time it must be observed that most of the linguistic peculiarities have analogues in classic Heb.

Date and Authorship.—No one without violence to facts can maintain the Solomonic authorship. The author assumes the name of Solomon as Browning speaks as 'Abt Vogler' of 'Fra Lippo Lippi.'

Canonicity.—It formed part of the Alexandrian Canon when the younger Strabon went to Egypt. In the time of Josephus it was in the Canon of Judea. The Talmudic stories about the Council at Jabne are of historic value.

Versions.—The LXX. is slavishly close to the Heb. The Peshitta is much freer. The Targum is very diffuse, but supplies

the Jewish interpretation which is very interesting. The Vulgate is fairly accurate.

Commentaries.—The full list up to 1860 is given in Ginsburg's *Cohleth*. Since then there have been commentaries by W. Wright (1865), O. Zockler (1881), and G. Barton (1908).

Ecclesiastical Commissioners, body appointed in 1835 as a perpetual corporation to examine into the temporal affairs of the Church of England. They made five reports, recommending alterations in the number of bishoprics, and the appropriation of part of the revenues of charters and collegiate bodies to parochial purposes. Some of their recommendations have been adopted since that time. E. C. were also appointed for Ireland to receive and apply the incomes of the suppressed bishoprics in that kingdom under an Act passed in 1833. The E. C. are composed of certain bishops and other church dignitaries, together with certain laymen. They exist now to administer church property, to create new ecclesiastical parishes, and to sanction repairs and improvements in churches or church buildings. When an incumbent dies or resigns they are the body to settle any questions of dilapidations that may arise. One of the chief aspects of their general power of administering church property lies in the direction of enhancing the value of the smaller livings so as to provide the worst paid clergy with more substantial incomes. In this work they have been assisted by the efforts of other societies, lay and clerical, and by the organisation of funds outside, like the 'Bishop of London's Fund.' A scheme for the administration of a pension fund for facilitating the retirement of aged or infirm clergy holding poor benefices was framed in 1907 and enlarged in 1915.

Ecclesiastical Courts are courts in which the canon law is administered and causes ecclesiastical determined. Formerly those courts had a wide criminal and civil jurisdiction over laymen as well as clergymen, embracing among civil matters divorce, probate, and suits for tithes, and among criminal, blasphemy (*q.v.*), apostasy from Christianity, and brawling within the precincts of a church. Gradually the common law courts have usurped almost the whole of this jurisdiction so far as laymen are concerned, while as to clergymen, the jurisdiction of a more purely civil and temporal character exists only to provide spiritual sanctions in the shape of suspension or deprivation. Their jurisdiction in practice, if not in theory, is for the most part over purely spiritual causes, *i.e.* in matters of church discipline and the correction of offences of a spiritual kind. The principal E. C. are: (1) The Bishops' Consistory Court, presided over by the bishop's chancellor (*q.v.*), which can try clergy for uncleanness and wickedness of life, but not for doctrinal offences. Some authorities believe it can still try laymen guilty of heresy or incest. Since the passing of the Incest Act, 1908, made the offence of incest a crime cognisable by the ordinary courts, it may be assumed that

jurisdiction of the consistory courts over laymen is obsolete, although theoretically it can punish laymen by refusing them the Sacrament and prohibiting them from entering a church for such offences as the above, and for brawling. In exercising quasi-criminal jurisdiction the chancellor is assisted by five assessors who act as judges of fact. (See also *CLEGGY DISCIPLINE ACT*, 1892.) The bishop can veto the prosecution of a clergyman for uncleanness and wickedness of life; the civil jurisdiction of the court relates principally to the grant of faculties for alterations in churches, questions of repairs to church fabric, and with disputed rights to pews. (2) The Court of Arches, presided over by the Dean of Arches. This court hears ecclesiastical appeals from the consistory courts of the bishops of the prov. of Canterbury, and has jurisdiction over the thirteen peculiar par. in the diocese of London. It also has the transferred jurisdiction of the old Provincial Court of the Archbishop of Canterbury. The court tries also doctrinal offences and practices under the Public Worship Regulation Act, 1874. (3) The Provincial Court of the prov. of York, which hears appeals from the consistory courts in the diocese. (4) The Court of the Archbishop, presided over by the archbishop or his vicar-general, which has jurisdiction to try bishops for eccles. offences. The Court of the Bishop sitting in person, the Provincial Court of the Archbishop of Canterbury, and the Court of the Archdeacon are obsolete. The judicial committee of the Privy Council is the supreme court of appeal in all eccles. matters.

Ecclesiastical Dilapidations, in Eng. law, comes under the heading of waste. In England the incumbent of a benefice is compelled to keep his residence and its outhouses in a proper state of repair, i.e. free from dilapidations. If he be rector he is further obliged to take charge of the fabric of the chancel, though he is not compelled to supply the ornaments or painting thereof. The holder of a benefice who fails to fulfil these obligations is liable for an action for dilapidations to be instituted by his successor, the money so recovered being applied to the repairs. On entering a benefice where the parsonage house, etc., are dilapidated, the new incumbent must carry out all repairs under the instruction of the bishop, issued on receipt of a complaint from the archdeacon, rural dean, or patron of the benefice. Each diocese has a surveyor of dilapidations, who reports on the condition of church property. In Scotland the heritors are under the obligation to repair manse, except in the case of 'free manse'.

Ecclesiastical Law, law administered by the eccles. courts (*q.v.*), the principles of which are derived mainly from the canon law and civil law (*q.v.*). In England E. L. never gained that ascendancy over the municipal law of the state which characterised countries where the traditions of the Holy Rom. empire were so deep-rooted as to subordinate the state to the papal see. The revival of the study of

Rom. law, or the new learning as it is called, in the eleventh century, at the time Irnerius lectured at Bologna, had no permanent effect on England; it found a small, homogeneous, well-conquered, much governed kingdom, a strong legislative kingship. It taught us much, and then there was healthy resistance to foreign dogma' (Professor Maitland). The assimilation in part of the principles of canon and civil law may be said to have been due to the fear of the Church that the revival of learning in the eleventh century would crush the monarchy of theology over the intellectual world; and the Church to save itself vivified its teaching in law much in the same manner as the fathers imported some of the philosophy of Aristotle into the Bible. E. L. in England was always useful in overcoming the inelasticity of the common law, the principles of which for centuries allowed of no testamentary disposition of lands, and at a time when personal property was of little importance. E. L. governed also wills of personality, through the jurisdiction of the lord-ordinary. E. L. also prevailed in all kinds of matrimonial causes. But although many of the principles of E. L. are still retained in probate, divorce, and matrimonial causes, the jurisdiction of the ecclesiastical courts in these matters has passed to the High Court. See also **ECCLESIASTICAL COURTS**.

Ecclesiastical Titles Act, Act passed in 1851 to prohibit the assumption by any unauthorised person of a title from any place in the United Kingdom, whether or not such place were the seat of an archbishopric, bishopric, or deanery, and declaring null and void all acts done by them, or gifts made to them under such titles. The Act was the legislative expression of the hatred of papistry, which was so rife during that period. The immediate cause of the Act was the Oxford Movement led by the celebrated Mr. (afterwards Cardinal) Newman, whose followers, the so-called Tractarians, endeavoured to prove that the doctrines of the Church of England were essentially similar to those prevalent in the primitive Catholic Church. The people, as a whole, took this revival of religious energy to be no more than a reconciliation with Rome, and the prevalent excitement consequent on the secessions from the Estab. Church to the Church of Rome led to Lord John Russell securing the passing of the E.T.A., which, however, through the weakness of its provisions, remained nugatory. It was repealed in 1867. In this connection we may note that the Statute Book still contains an Act passed in 1829 which prohibits the assumption by any persons other than the person authorised by law, of the name, style, or title of an archbishop, bishop, or dean of the Church of England.

Ecclesiasticus ('the wisdom of Jesus, the Son of Sirach'), the church book, an apocryphal (deuterocanonical) work to which this name was given by the Rom. Church. The Gk. name is 'the wisdom of Jesus, Son of Sirach,' or, more briefly, 'wisdom of Sirach.' The original name

is said to have been 'Proverbs' in Heb., though it was known to the Rabbis under the name 'Book of Ben Sira'. The original was in late Heb., and only a few verses are preserved by the Jewish oral tradition in a very mutilated condition. But if its prologue may be trusted, the Gk. trans. was made by a descendant of the author and, it is thought, from an autograph copy. This is the only case in Biblical literature in which the family tradition of a book has been preserved.

Authorship.—The statement of the translator fixes the date of the author approximately as being in the third century B.C. Josephus makes mention of it, but he can never be taken with safety as a guide to historical facts, and a date about 200 B.C. is generally accepted as the date of this work.

Contents.—The Book of Ben Sira is upon much the same lines as the Biblical Books of Psalms, Proverbs, and Ecclesiastes, and as such contains hymns, prayers, rules of conduct, and speculations on a variety of subjects. It would seem that the book was at first intended for the author's family, as the precepts are often addressed 'my son, my children.'

Relation to canonical books.—The author appears to have a thorough knowledge of the O.T. books, and quotes very freely from them; and although he omits the names of Daniel, Ezra, and Esther from his list of Heb. heroes, some of his phrases seem to be taken from the Book of Daniel. He appears to have been unacquainted with the Chronicles.

Language and style.—Late Heb., with the rabbinical terminology well developed.

History of the text.—Josephus's silence about the work is attributed to the supposed antipathy of the author to the Maccoean and Herodian dynasties. The original text existed as late as the fourth century A.D., because Jerome claims to have seen it. It is supposed to have been destroyed by the Jews owing to the similarity of the sayings of Jesus of Sirach and Jesus of Nazareth. Many attempts have been made to restore the original, but up till now none have been successful.

Ecclesiology, the science and study of church archaeology, architecture, and decoration. It also comprises church hist., as revealed by these.

Eccremocarpus, a genus of Bignoniaceæ, contains three species of handsome Peruvian plants. *E. scaber* is climbing and half-shrubby in habit; it grows in thickets and hedges of its native country, and will live in the open air in the milder parts of England.

Echegaray y Elizaguirre José (1832-1916), Sp. politician and dramatist. In 1858 he became a prof. of mathematics and pub. sev. valuable scientific works. It was not till he was forty years of age that he turned his attention to the writing of dramas and comedies. His works, which were issued under the *nom de plume* of Jorge Hayaseca, satirise the vices of society, and were very popular. Among his works may be mentioned: *La Esposa del vengador* (1874), *En el pilar y en la cruz* (1878), *Muerte en los labros* (1880), *Dos*

Fanatismos (1887), *Mariana* (1892), and *El loco Dios* (1900).

Echelon (Fr., ladder), military term used of a regiment, the formation of whose troops resembles a ladder; that is, the diva. march in parallel lines, not exactly behind each other, but each to the right or left, of the preceding one.

Echidna, or Spiny Ant-eater, name given to two species of mammals in the order Monotremata; these are *Echidna aculeata*, or common E., and *Proechidna bruijnii*, or three-toed E. The former, which has five toes on each foot, all clawed, inhabits Australia, Tasmania, and New Guinea, while the latter is found only in N.W. New Guinea. Both are fossorial and mainly nocturnal animals, frequenting rocky dists. and subsisting chiefly on ants. The upper surface of the head and body is covered with a mixture of stiff hairs and short thick spines. It has a long, slender, beak-like snout, with the elongated, cylindrical tongue common to all ant-eaters. The E., and the Duck-billed Platypus (*Ornithorhynchus*), which together constitute the Monotremata, are unique amongst mammals in their mode of reproduction, by the laying of eggs.

Echinidæ or Echinoidæ (Gk. *ἐχίνος*, hedgehog), the sea-urchins, form a class of Echinodermata (q.v.) which also includes the star-fish and sea-cucumbers. They live off rocky coasts and move by means of their spines and their tube-feet. The spines also serve as organs of protection, and some sea-urchins have a poison-gland attached. Some species cover themselves with bits of rock and seaweed, and so move about unobserved; others bore their way into holes and remain there. The common *Strongylocentrotus* is a boring urchin, and when the waves wash into the hole it sets its spines against the rock and retains a rigid position. *Echinocardium*, the shield urchin, *Brissonia*, the heart urchin, and *Diadema*, which is said to be covered with compound eyes, are other well-known genera. The hollow external skeletons of *Echinus miliaris* are often to be found on the seashore; *Echinus esculentus* is an edible species. Palæo-Echinoidæ, the fossil forms, appear in the Lower Silurian rocks.

Echinocactus, genus of Cactaceæ, contains about two hundred species, most of which are natives of Mexico and the W. Indies, but a few occur in Brazil. Many of the flowers are large and conspicuous for their beauty.

Echinococcus, name given to certain Cestoda in the cystic or bladderworm stage. *E. polymorphus*, or *E. velerinorum*, is found in sheep, in domestic animals, and occasionally in man; in its mature or tapeworm stage it infests dogs. The bladder, which is known as a hydatid cyst, occurs in the liver, brain and other places; it may reach the size of a football and calls for surgical intervention. See CESTODA, TAPEWORM HYDATID DISEASE, and BLADDERWORM.

Echinococcus Disease, see HYDATID DISEASE.

Echinodermata (Gk. *ἐχίνος*, hedgehog, and *δέρμα*, skin), name given to the great

branch of invertebrate animals which includes Holothuroidea, the sea-cucumbers; Echinoidea, the sea-urchins; and Asteroidea; the star-fishes, etc. They are exclusively marine, and feed chiefly on small animals; their main characteristic is the water-vascular system, which is connected with the tube feet, and provides the means of progression and respiration. Many of the E. have the power of casting off and regenerating different parts of their bodies. The Echinoidea are predominantly globular, but a few are discoid. The body is enclosed in a shell of polygonal plates, accurately arranged in double rows, and covered with knobs or spines, and small stalked outgrowths, pedicellariae, some provided with 2, others with 3, blades, between which they seize any foreign particles or small animals and remove them, so keeping the shell clean. There is a complicated masticating apparatus, formed by the 3 teeth and 15 other pieces, and known as Aristotle's lantern. The animals move generally with the

and are mostly fixed to the sea-bottom, or rock surface, by a jointed stalk; they are also very common as fossils. The feather-star swims by movements of its 'arms' and alights by means of small leg-like outgrowths on them. Most E. lay small eggs in the sea, and these develop into larvae of various types. E. in the colder seas retain the eggs in the body-cavity, or swallow them and keep them in the stomach until they develop. In a few cases, after their release, the young are protected by the mother, and lie in depressions or among the spines on her body. The Blastoida and Cystidea, extinct classes of E. are found in the Lower and Upper Silurian and some Cystides in the Cambrian rocks.

Echinolampas, generic name of certain species of echinoderms in the family Cassidulidae. They are heart-urchins, with the anus on the under-surface.

Echinophora, genus of umbelliferous plants, is to be found in the Mediterranean. *E. spinosa*, the sea-parsnip, is an inhab. of sandy sea-shores, and has pinnate spinose leaves.

Echinorhynchus, name given to a genus of parasitic worms belonging to the Nematoda, and grouped under a special class, Acanthocephala.

Echinus, see SEA-URCHINS.

Echites, name of a genus of Apocynaceae. The species are bushy plants with large and brilliantly coloured flowers, and came originally from India.

Echium (botany), see VIPER'S BUGLOSS. **Echmiadsin**, meaning in Armenian, 'the only begotten Son came down.' A celebrated monastery in the Armenian S.S.R. Since 1441 the seat of the Armenian 'Catholicos' and the religious centre of the Armenian Church. The monastery consists of three walled enclosures, each with a cathedral. The oldest is the principal cathedral, dating from the year 305; the most famous from an architectural point of view is that of St. Ripsimi, built in 518. Near by is an archeological and ethnographic museum. A motor road leads to Erivan. E. was long under Persian rule, but was ceded to Russia in 1828.

Echo, in Gk. mythology, was a nymph who repelled the advances of Pan; the god, in revenge, caused the shepherds to tear her to pieces till only her voice remained. Another version, related by Ovid, is that E. was a nymph whom Zeus employed to talk to Hera in order to prevent her from discovering his amours. Hera, discovering the ruse, changed E. into a person who could only repeat the last words of somebody else's speech. E. then fell in love with Narcissus, and pined away in despair till only her voice remained.

Echo, imitative sound produced by the waves of sound when reflected from something denser than the aerial medium. Sound obeys the same laws as light, and is reflected at the same angle as it strikes the reflecting object. Since the velocity of sound is 1125 ft. per second, an observer situated at a distance of 562 ft. from a reflecting surface at right angles would hear the E. in one second, and would hear



ECHINODERMATA

Left, Asteroidea. Right, Holothurian.

mouth directed towards the ground. There are two orders: 1. Paleoechinoidea, comprised solely of extinct and fossil forms, the oldest members being found in the Upper Cambrian. 2. Euechinoidea, including all living and some extinct species. The Asteroidea is typified by *Asterias rubens*, the common five-rayed starfish, whose native haunt is the floor of the ocean at great depth, but which is often seen in shore pools at low tide. Allied to this class are the Ophiuroidea, or brittle-stars, whose arms, however, branch out more abruptly from the central part. Like the Echinoidea, the Asteroidea have outgrowths of spines and pedicellariae. At the end of each arm there is a bright red spot, the 'eye,' which is sensitive to light. Starfishes feed on bivalves, flattening the tube feet on the two halves of the shell and then widening the arms of the star so that a steady pull on the muscles is exerted. The water-vascular system communicates with the exterior by a short canal, the stone canal, and an opening, the madreporite, which in Echinoidea and Asteroidea is represented by a porous plate. The Holothurians differ at first sight from other E., as they have a plump, cylindrical body and a soft, leathery skin, in which is embedded a series of calcareous plates. Holothurians are generally sedentary. They live on the sea floor, and can crawl by means of their tube feet. These are not developed in species which burrow in the mud. The Crinoidea, featherstars or sea-lilies, grow together in great masses,

as many words as would last for that space of time. Various natural peculiarities of configuration have made the Es. in many different parts of the world famous.

The modern 'Echo sounder' is a machine which records electric impulses 'bounced' off the sea-bed. It is now in use by the Hydrographic Dept. of the Admiralty in recharting the oceans.

Echo de Paris, a daily newspaper of Paris. It was founded in the year 1884 by Aurelian School. The paper was managed with skill, and numbered among its contributors many men of versatility, wit, and talent. At the time of the Dreyfus affair it was noteworthy as espousing the cause of the army. Among the best known of its editors have been Jules Lemaitre and Quesnay de Beaurepaire.

Echowe, see **ESHOWE**.

Echternach, tn. of the Grand Duchy of Luxemburg. It stands on the R. Sure, about 20 m. N.E. of the city of Luxemburg. The inhabs. are chiefly engaged in the manuf. of damask, linen, porcelain. It is famous for the ann. procession on Whit-Tuesday, in gratitude for the ending of the penitential dance mania which raged in this neighbourhood in the eighth century. There is a famous abbey here, founded by the A.-S. Willibrord, Bishop of Utrecht, and a thirteenth-century par. church. E. was the southern point of von Rundstedt's desperate counter-offensive in the Ardennes (Dec. 1944-Jan. 1945). By the time the Ger. drive was halted the enemy had breached a 45-mile gap in the Amer. lines from E. to Monschau. (See also **WESTERN FRONT IN SECOND WORLD WAR**.) Pop. 3500.

Echuca, tn. of Victoria, Australia, situated on the Campaspe and Murray rvs., 156 m. N. of Melbourne. A bridge 1905 ft. long connects E. with Moama on the New S. Wales side of the Murray. It trades in wool, wine, red-gum, timber, etc. Pop. 4000.

Eclja, or **Ezija**, tn. of Spain, in the prov. of Seville. It is situated on the l. b. of the R. Genil, or Jenil, a trib. of the Guadalquivir. The dist. is extremely fertile, and the corn crops are good. Fruit is also cultivated, and wine is one of the chief products. A small amount of cotton is also grown. The manufs. are woollens, flannel, silk, linen, leather, and shoes. The climate is very hot, and this has earned for the tn. the nickname of the 'frying pan of Andalusia.' Pop. 30,000.

Eck, or **Egg**, **Johann Maler von** (1486-1513), Ger. scholar and theologian, b. at Egg, in Swabia. He excelled in controversy, and attacked Luther's thesis on indulgences, and defended the Catholic doctrines in the celebrated congress of Leipzig in 1519. Thenceforward he was one of the bitterest opponents of the Reformation; in 1525 his exposition of Catholic dogma appeared in answer to *Leuz theologiques* of Melancthon, and was very successful. He took a prominent part in the congresses at Baden and Augsburg, and in 1530 sent a refutation of the Protestant confession to Charles V. In 1537 he pub. a Ger. N. T., and took part

in the meetings at Worms in 1540, and at Ratisbon in 1541.

Eck, **Loch**, an inland loch of Scotland, situated in Argyllshire. It is about 6 m. long and enclosed by mts. Salmon and trout abound.

Eekart, or **Eckehart**, **Johannes**, see **ECKHART**.

Eckermann, **Johann Peter** (1792-1854), Ger. writer b. at Winsen an der Luhe, and a friend of Goethe; known principally through his *Conversations with Goethe* (1837), trans into Eng. by Margaret Fuller (1889).

Eckernförde, tn. of Schleswig-Holstein, Germany, on the Baltic between Kiel and Flensburg, with fishing trade, and manufs. of tobacco. Pop. 10,200.

Eckersberg, **Carl Christopher Vilhelm** (1783-1853), Dan. historical, marine, and portrait painter, b. at Varnäs, Slewig. He became a pupil of Abildgaard and afterwards of David, and later, Thorwaldsen. It has been stated by his native admirers and critics, that he first 'created a Danish colour.' His landscape scenes are clear and definite and the outlines natural, while his figures are conventional.

Eckhart, **Eokart**, or **Eckehart**, **Johannes**, very generally styled **Meister** (1260-1329), Ger. mystic, and one of the first of speculative thinkers, b. at Hochheim bei Gotha. Very little is known concerning his life. He entered the Dominican order, and studied and taught in Paris. After being made prior at Erfurt, he was vicar of his order in Thuringia. He was made vicar-general of Bohemia in 1307, and a few years later he preached at Frankfurt, Cologne, and Strasburg. His reputation for learning was very high, and he assisted in a controversy between Pope Boniface VIII. and Philip of France. In 1327 his enemies caused him to be summoned at Cologne before the Inquisition on a charge of heresy, where he partly recanted. Two years later he was again accused, and extracts from his works condemned, but he died before the bill against him was pub. His sermons and tractates written in Ger. and Lat. are all that remain of his works. In his teaching he was an Aristotelian. He began with his doctrine of the Divine nature, following it by the relationship of God and man. His style was curt and abounded in symbolic expressions.

Eckhel, **Joseph Hilary** (1737-98), an Austrian numismatist, b. at Enzersfeld, Lower Austria, who, in 1773 was made prof. of antiquities and numismatics at Vienna Univ. His chief work is *Doctrina Nummorum Veterum* (1792-98).

Eckington, par. and tn. of Derbyshire, England. The tn. is situated 7 m. S.E. of Sheffield. There are saw-mills, and manufs. of agric. implements. Pop. 13,000.

Eckmühl, or **Eggenmühl**, vil. of Bavaria, situated on the Isar, 15 m. S. of Ratisbon. It is noted as the scene of a battle fought there in 1809 between the archduke of Austria and Napoleon I., in which the former was defeated. Pop. 400.

Eclampsia (from the Gk. *εκλάμνω*, 'to call aloud'), term applied to a form of epileptiform convulsions occurring in

pregnant women, with an associated condition extremely dangerous to the child, and not free from danger to the mother. It is due to changes in the kidney, which can be detected only by chemical examination of the urine. E. is a haunting dread before and during confinement, as suddenly a woman, in apparently perfect health, may be seized with convulsive attacks which may end fatally. E. is prevented by checking the longings of pregnancy, leading a quiet healthy life, and giving careful attention to hygiene.

Eclecticism (Gk. ἐκλέγω, I select), in philosophy is the principle of selecting and adopting views from various systems of philosophy, and uniting them into one composite system of thought. Among the earliest eclectics must be numbered Cicero, the Peripatetics, and the Neoplatonists. The eclectic system of philosophy has gained great popularity in France, owing to the teaching of Victor Cousin, Adolphe Garnier, and others. Cousin asserted that 'Each system is not false, but incomplete, and in reuniting all incomplete systems we should have a complete philosophy, adequate to the totality of consciousness.'

Eclipse, see *under* MOON, OCCULTATION, SAROS, STARS, and SUN.

Ecliptic. The path which the sun takes in its apparent yearly journey from west to east among the fixed stars. This path lies through the middle of the constellations known as the Signs of the Zodiac (*q.v.*). Of course the E. is only the apparent path of the sun, for the earth revolves around the sun. If it were possible to view the earth from the sun, it would be found that the earth's orbit lay along the E. The E. lies at an angle to the equinoctial of $23^{\circ} 28'$ at the time of the sun's greatest declination, and cuts the equinoctial at two opposite points, called the 'equinoxes,' at about March 21 and Sept. 23.

Ecolite, **Eklogite**, or **Disthene Rock**, rock formation, crystalline in character, and composed of smaragdite and red garnet. Occasionally feldspar, quartz, iron ores, etc., form a part of this exceedingly beautiful rock. It is not found in any great abundance, but it is seen among the Alpine mts., the Fichtelgebirge, at Baden, etc. The garnets in E. are frequently surrounded by a covering of bright green hornblende.

Elogue, name given to a short pastoral poem in verso. The derivation of the word is obscure, the most common one being from ἐκλέγω, to choose, E. thus being selected poem; another derivation is from αἶς, a goat, and λόγος, speech, the word thus being a dialogue of shepherds. In the first form, dialogue was not indispensable to an E.; it was owing to the grammarians, who reserved the term E. to the bucolica of Virgil, which were in the form of dialogues, that E. came to mean only a poem in such a form. The first poet to write Es. was Theocritus, of whose works in this form there are about thirty extant; they are written in the Doric dialect, and mostly in hexameters. Then Virgil wrote his Es., which he pur-

posely called bucolica in order to challenge comparison with Theocritus. Other writers of Es. in Lat. were Calpurnius Siculus and Nemesianus. In the sixteenth and seventeenth centuries the writing of Es. was again practised; Alexander Barclay (1514) was the initiator of the fashion. The most successful of the Eng. writers of Es. was Spenser, whose *Shepherd's Calendar*, of 1579, was much admired. From this period until the time of Pope, Es. were produced at intervals. Among the collections pub. may be mentioned Drayton's *The Shepherd's Garland*, *The Shepherds' Pipe*, by Browne, Wither, Brooke, and Davies. Pope and Ambrose Phillips pub. vols of Es. in 1709, but both were outclassed by the *Shepherd's Week*, 1714, of Gay. Since then Es. have not been written, except by John Davidson in *Fleet Street Eclogues* (1893-96). The treatment of most of these Es. is akin to pastoral, and for a fuller description of peculiarities of form, etc., see the article on PASTORAL POETRY. Of foreign Es. those in Fr. of J. R. de Segrais (1624-1701) are noteworthy, and those in Span. of Garcilaso de la Vega (1503-36). In fact, the latter's *Se dulce lamentar de los pastores* is one of the finest poems of its kind, ant. or modern. See E. C. Knowlton, 'Pastoral in the Eighteenth Century,' *Modern Language Notes*, xxxii., 1917; M. K. Bragg, 'The Formal Eclogue in Eighteenth-Century England,' *Maine University Studies*, 1926.

Ecology (Gk. οἶκος, house or abode, λόγος, discourse) is the study of the organism as a whole in relation to its environment. Since land plants are stationary, the study of plant E. is much easier, and consequently much more advanced, than that of animal E. On the other hand, plants and animals are so closely interdependent that investigation of the E. of one group involves that of the other. There are two main subdivisions of E. (1) Autecology, concerned with the separate environmental factors and their effect on individuals. (2) Synecology, dealing with the combined effects of these factors on plant and animal communities. The chief environmental factors governing the distribution of plants and animals are temp., humidity, climate, soil, the intensity of light, the nature of the food, and interaction with other plants and animals. The individual effect of each separate factor is studied in the laboratory; the combined effects are seen out of doors, in woods, fields, swamps, lakes, seas, and other habitats. Generally speaking, animal communities are determined by plant communities—that is, by plants growing together and forming groups with a certain individuality. Any particular type of community is described as an association, and the general appearance of a plant association is determined by dominant species, e.g. the pine tree is the dominant species of a pine-wood association: in a mixed wood, oak and beech may be co-dominants. Associations having only one dominant species are called consociations. Plant associations show stratification; in a wood, trees constitute the

uppermost strata, bushy undergrowth the next, herbs the third, and mosses and liverworts the fourth. Beneath these are soil algae, fungi, and various bacteria, and protozoa, which by effecting changes in the soil affect the plants growing in it. Further change is effected by the constant addition of humus to the soil, and as a result of such changes the character of the plant community gradually alters, other organisms better adapted to the changed soil gradually replacing the earlier ones. This process is termed ecological succession, and is concomitant with an ecological succession of animals. By studying the changing conditions as the level of Lake Michigan falls, Shelford has been able to predict, with regard to beetles of the genus *Cicindella*, the succession that will be determined by further fall in level. Since within limits animals can choose their habitat, behaviour is an additional factor of animal ecology. Animals form strata in a different manner from plants. The bottom stratum may be regarded as composed of animals forming food for those of the next stratum, and so on, until at the top are animals which have no enemies or are able to defeat them by virtue of size or skill. Thus spiders eat flies; small birds eat spiders; larger birds eat smaller birds. In this way animals form food chains, those forming the first link being far more numerous than those of the last. The first link consists obviously of herbivores capable of reproducing in enormous numbers, while the animals of the last link have limited means of reproduction and reduce competition between themselves by sharing out food areas. Other important factors in animal E. are the size of food and the status of the animal in the community, and interesting problems are presented by the phenomena of symbiosis and the specialisations of parasites. The extensive field of E. provides interesting material for the amateur who makes careful observations and keeps accurate records. See C. Elton, *Animal Ecology*, 1927; A. Tansley, *The British Isles and their Vegetation*, 1939; A. S. Pearse, *Animal Ecology*, 1939; also articles in *The Journal of Ecology* and *The Journal of Animal Ecology*.

Economic Blockade, see BLOCKADE; **DECLARATION OF LONDON**; **ECONOMIC WARFARE**, **MINISTRY OF**.

Economics, term (*οικονομία*) by which the anc. Gks. used to signify the art of prudent and systematic household management, with particular reference to income and expenditure, and to the labour and satisfaction of the wants of the members of the household. Political economy, now generally described as E., later came to signify the art of directing carefully the production and consumption, the incomes and expenditures of the state and its subjects. It was not commonly conceived as a neutral science till the nineteenth century, when it became the science of wealth and exchangeable values. In the theoretical treatment of the matter some economists proposed to limit the term 'political economy' to the narrow science of wealth; but in about the middle of the

nineteenth century, the Historical school (Roscher and others) maintained that the subject of the study was not wealth, but man's relation to wealth; that it was part of general social science and could not be detached from ethics and politics. Following Adam Smith, and popular interpretations of the term, political economy may be defined as the ordered knowledge of the social phenomena arising out of man's activity in the acquisition and use of wealth. Wealth means things possessing value of some kind which usually cost labour, and which satisfy human wants, and exist in quantities below the demand, so that each unit of them possesses distinct importance to man.

The hist. of economic thought begins with the anc. Gks., who confided everything to the power of the state, which resulted in the subordination of the individual to the state, and consequently in the subordination of E. to ethics and politics. The Gk. philosophers condemned interest-taking, and were prejudiced against trade and commerce. The Romans followed the Gks.' ideas, and also made important studies on particular economic problems; but failed to estab. a dominant system of economic thought. Christianity strengthened in general the prevalent Aristotelian system of economic philosophy, its condemnation of usury and the pursuit of wealth in trade, its assertion of the superiority of agriculture, and its support of status. Christianity thus strengthened the subjection of E. to ethics, but weakened the subjection of E. to politics. The early fathers, in their condemnation of avarice and their exaltation of fraternal love, sometimes used expressions which, taken by themselves, imply an utter condemnation of private property and an advocacy of communism among the faithful, but this was only an ideal, and private property was early recognised as a necessity resulting from the fall of man. The effect of this ideal, however, appears in the accepted doctrine, that the maintenance of the poor was not a matter of philanthropy, but an obligation. The scriptural attitude towards wealth led to an emphatic statement of the moral superiority of agriculture and handicraft over trade and commerce as a means of earning a livelihood, and the early writers seemed almost unanimous in the belief that what the seller made by trade the buyer necessarily lost.

With the increasing temporal power of the Church and the great development of commerce which marked the eleventh century, came the necessity of harmonising the doctrines of the Church with the obvious requirements of commerce, and many concessions were made by the later canonists. Thomas Aquinas (1226-74) concedes that it is lawful to trade for a simple livelihood, or in order to supply a country with the necessary articles which it does not produce, or when the profits of the trade are devoted to some honourable purpose, such as the assistance of the poor; but that, save in exceptional circumstances, a seller is bound to reveal a fault in an article, and that it is not

permissible to sell an article for more than its worth. The fundamental axiom, in accordance with which all these conclusions are reached, is that every commodity has a fixed and objective value, which can readily be ascertained, and which determines its just price. The distinctively ethical standpoint of the canonists is shown in the prohibition of usury, which was based upon Scriptural injunctions against it and upon Aristotle's argument that money being barren, it would be extortion to charge for its use. As the growing commerce of the Middle Ages made the need of borrowing capital more and more imperative, the canonical theory had to be stretched so as to accommodate many ingenious forms of contract for what was practically, though not nominally, usury. In the latter half of the fifteenth century the Franciscans themselves instituted the *Monts-de-piété*, or charitable banks, for lending money to the poor at a small rate of interest to defray expenses of management.

Ethical considerations dominated medieval economic theory; political necessities that of the early modern period. The new national govts. had to secure greater revenue and in a liquid form. Ready money was necessary for the up-keep of armies and navies; and to meet the other requirements of a national power. It was imperative to find or create some better sources of revenue than the backward agriculture of the time. These necessities led to the development of a mercantile system. The restrictive regulations, discriminating laws, and state interference which Adam Smith and his immediate successors described as the essential features of mercantilism have been, in a sense, incidental. State interference was a minor consideration, as it was not the problem at issue. The mercantile system resulted not in a loss; but in a net gain of individual freedom. Along with the imposition of those external restrictions which mark the mercantile economy went a rapid and extensive abolition of internal restrictions, which had been far more numerous, brutal, and destructive than the new external regulations which succeeded them. The economic and political unit had merely increased in size.

Mercantilism was the most important phenomenon of economic thought in the sixteenth and seventeenth centuries, but it constituted no more than a part of a widespread and eager investigation of concrete economic facts. These studies became materials for Adam Smith's work. Money, banking, the rise of prices, poor relief, etc., were extensively discussed in brochures and monographs. The maintenance of the poor was a constant subject of pamphlet and tract; Sir Thomas More, in his communistic *Utopia*, gives striking evidence that the problem of poverty occupied the attention of the best thinkers of the time. True, economic study had been separated from ethics and theology, but men like Bodin, Grotius, Pufendorf, Hobbes, and Locke developed it into an essential part of a general political philosophy.

After mercantilism with its undue preference for commerce and industry and for a favourable balance of foreign trade there was bound to be a reaction in favour of agriculture. Mercantilism was the economic expression of nationalism: agriculture was now to find favour with the broad principles of natural law and liberty expounded in the works of Grotius, Pufendorf and Locke.

The preference for agriculture and industrial liberty found expression in the doctrines of the so-called physiocrats, the originator of which may be considered to be François Quesnay (1694-1774). The fundamental creed of the physiocrats was the subjection of economic and political phenomena to 'natural law,' which, as interpreted by them, gave rise to the familiar political doctrine of radical individualism, and a certain materialistic conception of



ADAM SMITH

wealth which somehow explains their peculiar economic theories. Adam Smith found that the physiocrats treated not only of political economy, but of every other branch of the system or civil government, and that their political and economic theories were indissolubly fused in their general doctrine of a beneficent law of industrial freedom, according to which the largest production and most just distribution of wealth would be best secured by permitting each individual to 'pursue his own interest in his own way,' so long as he did not infringe on the liberty of others. This theory has been perpetuated and popularised by Adam Smith, and has influenced subsequent thinkers more than any other economic doctrine ever formulated. The physiocrats exposed the mercantilist error of confusing wealth with the precious metals, but they themselves fell into the error of confusing wealth with material objects, by identifying the production of wealth with the production of raw materials, whereby they concluded that manufs. and

commerce, which merely change the position or form of raw materials, are barren and unproductive, though useful and desirable when strictly subordinated to agriculture; that the value added to raw materials in the process of trade and industry is equivalent merely to the cost of production, while agriculture yields a net surplus over and above the cost of production. Quesnay considers the large agric. employer to be the real producer of wealth, not the agric. labourer. Agriculture being thus the sole source of national revenue, simplicity, economy, and justice demand that the state revenue be obtained by a single direct tax levied upon rent. Accordingly the physiocrats were the first who stated the epoch-making theory of surplus value, and the theory also that the product of industry contains a certain value, due to the co-operation of natural factors, which is in excess of the minimum remuneration required to elicit the toil and sacrifice of industry, and which constitutes, on this account, a satisfactory source of taxation.

Adam Smith (1723-90) whose *Wealth of Nations* appeared in 1776, may well be considered as the greatest of economists and the Father of Economics. His influence hastened Free Trade, and popularised and dignified the systematic study of wealth; but his most important service was in divorcing political economy from ethics, and partly from politics. Such appears clearly in the delineation of his lectures, divided into four parts: I. Natural Theology; II. Ethics (included in his *Theory of Moral Sentiments* 1759); III. Justice and Jurisprudence; IV. Political Economy. He has been accused of treating man as merely a wealth-producing animal, in whom altruistic motives are wholly absent; but in his *Theory of Moral Sentiments* the motives of duty and sympathy are fully recognised, and the desire for wealth is treated as only one of the worthier objects of ambition. Further, in the *Wealth of Nations* he opposes piecework as calculated to excite the labourer to over-exertion, and voices the necessity for rest, diversion, and even 'dissipation.' His whole attitude is essentially this: 'Assuming that the object of the study is to increase the national wealth, this object will be most effectually secured by perfect industrial liberty.' On the other hand he did not succeed in separating politics from E., because his ultimate purpose was to prove the supreme efficacy of the doctrine of *laissez-faire*. Before being able to lay down maxims for the increase of wealth, he had to inquire how wealth was actually produced and distributed. It was his passionless analysis of production, value, and distribution which had the greatest effect upon the economists who followed him, and led to the attempt to formulate a non-partisan science of political economy, which should pass no ethical or political judgments.

It must not be forgotten that Adam Smith was not always consistent in the development of his theories. He advocates 'perfect industrial liberty,' yet he

does not hesitate to recommend the regulation of banking by the state. The same inconsistency, which was in reality due to breadth of thought, is visible in his method of investigation. Withal the fact remains that with economists immediately following him the science itself became increasingly theoretical, deductive, and abstract. His great quality was 'universalism.' His work dealt with the wealth of nations, not of a single state; his confidence in the existence of a natural law of universal application became a creed.

Malthus and Ricardo stand out among early followers of Smith and, with Bentham and other writers of the early part of the nineteenth century including McCulloch and James Mill, have been variously designated as the Classical, Orthodox, Ricardian, or Eng. school. Their general system of thought is harmonious, but they differed upon points of economic doctrine. They are deductive in method, pessimistic in tone, utilitarian and materialistic in assumptions, and cosmopolitan in the sense that their ultimate scientific ideal was the discovery of universal economic laws applicable at all times and to all nations. In France, J. B. Say may be placed in this group. He taught that supply creates its own demand (*Loi des Debouchés*) and his *Traité d'Economie Politique* (1803) was a major means of spreading the Smith views. The ethical framework of classical economy is due to Jeremy Bentham (1748-1832) through his formulation and continuous propagation of utilitarian philosophy. Bentham put it that 'To obtain the greatest portion of happiness for himself is the object of every rational being.'

The materialism and pessimism of the Classical school seem to be intensified in Malthus's famous *Essay on the Principle of Population* (1798). His theory that pop. tends to increase faster than food became the very backbone of classical economy, and modified almost every dept. of human thought.

David Ricardo (1772-1823), in his theory of distribution, made the most important use of the Malthusian proposition. He held that as a country grew and pop. increased, society would be forced to resort to poorer and poorer soils to obtain its supply of food, the law of diminishing returns would operate, and as the margin of cultivation was forced down, an increasing share of the product of industry would go to the landlord in the shape of economic rent—the difference between the natural productivity of the better land and the worst land in cultivation. Excluding rent, the div. of the remainder of the product between the labourer and the capitalist was determined by a corollary of the Malthusian principle—the 'iron law of wages.' This theory of distribution is fully developed as an integral part of his famous cost-of-production theory of value. When Ricardo said at times that all the expenses of production could be resolved into the toil and sacrifice of labour, he supplied the communists with their celebrated labour theory of

value, according to which labour is the sole cause of value, and consequently is entitled to the whole produce of industry, and Henry George (1839-97) with his doctrine that progress means poverty as long as private ownership of land is legal.

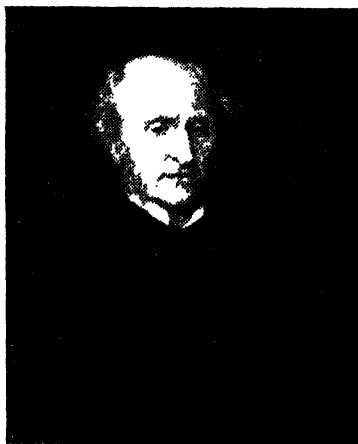
The most influential of Eng. economists between Ricardo and the younger, and greater, Mill, was N. W. Senior (1790-1864). He propounded the abstinence theory of interest; and formulated the famous doctrine of the wages fund 'that the average rate of wages is the quotient secured by dividing the number of workmen into the fund of capital set aside by the capitalists for the employment of labour.'

John Stuart Mill (1806-73) was a thorough reformer, and typifies the transition in England from the Classical to the Modern school of economic thought. He was first entirely under the influence of Ricardo, but in later years he followed Auguste Comte and the socialistic tendencies of his time. Fettered by the Ricardian E., but moved by the warm desire conceived in his maturer years, to find some means to improve the condition of the masses, his mind struggled hard to find a compromise between the two systems. The outcome of this mental battle appeared in 1848 under the title, *Principles of Political Economy, with Some of their Applications to Social Philosophy*. This book was brilliantly written and became widely popular. It exercised an enormous influence upon the subsequent development of Eng. economic thought. He preserved the old doctrine of rent and profits, and advocated *laissez-faire* as a general principle of political expediency, but made so many exceptions that at times they seem more important than the rule.

Since 1850 Eng. economic thought has been deeply affected by the reaction against the classical system. The logical successors of Ricardo and Senior were Cairnes, Hagahot, Fawcett, and, perhaps, Professor Marshall. All of them have been defenders of the Orthodox school, though they have recognised and expounded its limitations as a theoretical science. Thorold Rogers, Cliffe Leslie, Arnold Toynbee, Ashley, and Cunningham were historical economists who have more or less endorsed the general views of the Historical school (see below). A psychological school of political economy was founded by Jevons. He, Edgeworth, and others, made important contributions in every branch of the science, particularly in statistics. Eng. economists now use all schools or methods, be they deductive, historical, psychological, statistical, or mathematical.

The reaction against the school of classical economy began earlier in U.S.A. than in Germany, where it came to perfection. The first to stir up the hornet's nest were Alexander Hamilton, Daniel Raymond, Friedrich List, and some others. Raymond was the first to advance a distinctively Amer. system of political economy, which he exposed in his *Thoughts on Political Economy* (1820).

He holds, unlike Adam Smith, that wealth is not an aggregation of exchange values, but the capacity or opportunity to acquire the necessities and conveniences of life by labour. In his opinion the Eng. political economy, and the laws of wealth given by Adam Smith, were a study on exchange values, of private economy, as opposed to national economy, and untrue of a nation conceived as a unity. He is clearly as opposed to the doctrine of *laissez-faire*, as in favour of protection. The second period of Amer. E. belongs to the most influential of the earlier Amer. economists, Henry C. Carey (1793-1879). He was the most ardent apostle of protection, the



JOHN STUART MILL
The painting by G. F. Watts.

staunchest opponent of Ricardo, and may be considered as the originator of the present economic system of the U.S.A. He flatly denied the Malthusian principle and the law of diminishing returns, and drew his lessons from Amer. experience alone. His teachings were applicable exclusively to the America of his time, but he clearly showed that the fundamental premises of classical economy were not universally applicable. Later Amer. economists largely accepted the positive doctrines of the Ger. Historical school. Henry George and Francis A. Walker have exerted a world-wide influence upon economic thought.

The general development of economic thought since 1850 is to be considered as a series of reactions against the dominant doctrines of the classical system. Through Karl Marx communism acquired a positive theory deriving from Ricardo's theory of value and distribution. The claim is that, as labour is the sole cause of value, the labourer is entitled to the whole

produce of industry. Capitalism, it is asserted, is but a temporary stage in industrial evolution, and must inevitably give way to collective production. Marx's theory of value has met with but little favour, but his doctrine, that the underlying causes of social currents, such as religion, literature, and art, are economic in character (he calls this doctrine the 'materialistic conception of history'), has dominantly influenced economic science, particularly in Germany.

Auguste Comte (1798-1857) is the father of modern sociology. His influence was immense. He was the first to protest against the Ricardians' aim at an abstract science of rigid precision and universal of application. Comte was the precursor of the Ger. Historical school, which undertook the most influential reaction against classical economy, and is usually dated from Lorenz von Stein's *Der Socialismus und Communismus des heutigen Frankreichs* (1842), and, perhaps more justly, from Wilhelm Roscher's *Grundriss zu Vorlesungen über die Staatswirtschaft nach geschichtlicher Methode* (1843). Bruno Hildebrand and Karl Knies, must both be associated with Roscher and Stein in the introduction of this method, which not only has entirely transformed economic science in Germany, but also has deeply affected it all over the world. The positive doctrines of Roscher and his disciples maintain the propositions that E. is a social or political science which can be profitably pursued only in connection with the other sciences of political or social life, particularly administration, law, and hist. Thus they replaced a universal political economy by an historical national economy. The nationalistic spirit of the school was first expressed in Friedrich List's economic publs. (1789-1846). Roscher and his disciples made predominant use of the inductive method and adhered closely to actual economic phenomena; they held an intermediate attitude between protection and free trade; and they had discriminating sympathy for the claims of socialism. Generally they prefer state initiative to that of individuals for the solution of the problem of poverty, and have thus earned the nickname of *Kathedersocialisten* or State Socialists, as contrasted with the Social Democrats, whose programme they refused to endorse.

The theory of marginal utility has been most thoroughly developed and most widely applied by a group of Austrian economists, of which Menger, Wieser, Sax, and Boehm-Bawerk may be considered to be the leaders. They are commonly called the Austrian School of E., though the theory itself was propounded almost simultaneously in 1871 by Jevons in England, and Menger in Austria. The disciples of this school hold that the utility, or power, of satisfying want possessed by a commodity decreases per unit as the amount consumed increases, and the value itself expresses the utility of the last or marginal increment of the commodity supplied for consumption. The former unit of real value—i.e. the pain and sacrifice of labour—has made way for a unit of

utility; the cost of production theory of exchange has been replaced by a wider conception which holds that value determines the expenses of production, rather than the expenses of production the value, that capital receives its value from the finished product, and not *vice versa*. The tendency of this theory has been to shift the centre of gravity in E. from the capitalist to the consumer, and to block the movement to confine political economy to a study of exchange-value.

Political economy depends perhaps more upon hist. than any other science; but the extremists of the Historical school, who hold that, until a larger store of historical results is accumulated it is of little use to attempt broad theoretical generalisations, would confine E. meantime to the philosophy of economic hist. John Keynes (1883-1946) classifies the functions of economic hist. in connection with economic theory, as follows: First, to illustrate and test conclusions not themselves resting on historical evidence; secondly, to teach the limits of the actual applicability of economic doctrines; thirdly, to afford a basis for the direct attainment of economic truths of a theoretical nature.

Psychology is the alpha and omega of political economy, since any study beginning with human effort, and ending with the satisfaction of human wants, begins and ends with psychology. Psychological considerations are fundamental whatever approach is made to economic argument.

Economists employ diverse methods to come to their conclusions. Predominating are the deductive and inductive methods. The deductive method is appropriately so called because with it are employed the familiar processes of deductive logic. It is alternatively called hypothetical or abstract or speculative. Cliffe Leslie and others of the Historical school have characterised the conclusions of Eng. theory as inapplicable either to the explanation of existing conditions, or the solution of practical problems. Such antipathy to deductive theory is unjustified. The two methods are complementary and neither can well be pursued to the exclusion of the other. Verification by observation is in practice exceedingly difficult; as Mill found when he attempted to apply Ricardo's theories.

The inductive method is 'to observe the effects of a cause coming singly in action while all other forces remain unaltered.' There are two inductive processes: the method of difference, and the method of agreement. The method of difference requires that circumstances be compared with exactly similar ones, minus one factor. Such a condition seldom arises even approximately, and instances enough may be cited in which the method has been abused. The method of agreement is used to generalise, and to establish uniformities: it is somewhat speculative and needs to be used with discrimination. If little is to be done without the inductive method it nevertheless seldom convinces. The great difficulty of

induction in E. is the complexity of economic phenomena. The following percentage figures, given by Prof. J. W. Scott in *Self-Subsistence for the Unemployed* shew the increase in United Kingdom exports per head for five-year periods from 1840-44 and the decrease in such exports from 1870-74:

Five-year periods	1840-44	1845-49	1850-54	1855-59	1860-61	1865-69	1870-74
Exports per head	100 %	109 %	158 %	213 %	245 %	308 %	381 %
Five-year periods	1870-74	1875-79	1880-84	1885-89	1890-94	1895-1900	
Exports per head	100 %	81 %	90 %	84 %	82 %	81 %	

What economic truths do these statistics yield? The Corn Laws were repealed in 1846 and by 1860 the United Kingdom had complete Free Trade. These facts may largely account for the top percentages; but do they account in some way for the bottom figures? Around 1850 gold discoveries in California and Australia began to flood the world with great quantities of the metal. After 1873 gold production, though still high, slackened off somewhat; whereas in 1871 the world's demand for gold had risen steeply. This was due to Germany joining the United Kingdom on the Gold Standard and requiring huge amounts of gold for coin and reserves. Soon most of Europe followed Germany's lead; and later most of the world.

How far do the percentages reflect the increase in gold supply and, from 1871, the increase in demand? How far do they reflect other causes? One new important fact from 1871 onwards was the rising number of countries which had, as effect, a common currency—gold. Another was the increasing degree of industrialisation in Europe, America and elsewhere. The complexity of the relevant economic phenomena is not measured by the few facts mentioned, and it is safe to say that, whatever the true answers may be, inductive methods alone will scarcely provide them.

In 1914, before the First World War, the outstanding problem was unemployment. Linked with this was the hotly-debated question of Free Trade versus Protection. The Gold Standard was largely taken for granted. After two World Wars the unemployment problem has been solved in principle: Free Trade had become Multilateralism, and the subject of important international agreements under the auspices of the United Nations; while the Gold Standard had been twice abandoned, substitute arrangements being likewise brought within the scope of United Nations agreements.

In 1914 men went in fear of the Trade Cycle and recurrent slumps. When the First World War broke out they had already come to regard unemployment as a more or less unavoidable economic scourge and they were the more impressed at its disappearance during the war. They were further impressed by the freedom with which money flowed in wartime; and by the apparently bottomless state purse where war requirements were concerned. Fears or hopes that the First

World War would 'stop within six months' because of financial exhaustion proved fruitless. There were shortages of this material and that; but no shortage of money. As soon as the war was over the urgent cry of economy was heard and people felt it strange that while we could afford anything and everything to wage

a war, reasonable requests for highly desirable amenities and improvements in well-being were met with the blunt statement that there was no money available. While it was reasonable to suppose that a devastating war would scarcely increase well-being, people nevertheless could not but be impressed with the 'money for war; no money for peace' contrast.

People had heard stories about banks making money—creating money—in the war—and they were ready to believe that such powers should be used in peace-time to create money to be spent on the good things of life. And when, after the war, unemployment arose once more and reached unprecedented levels the 'short of money' argument seemed to run contrary to commonsense. It was contrary. Whilst, given full employment with full efficiency and no increase of saving every additional pound created must be inflationary, with unemployment in excess of minimum levels there is clearly not enough spending and we must either spend faster the money we have or create money to spend. This seems obvious enough now; but after the First World War there were still elementary misconceptions about the role of money.

Since barter made way for monetary transactions money had been of first, if not fully realised, importance in the economic field. A barter transaction was a complete exchange of goods for goods (or services). But a sale of goods for money is only a 'half' transaction which leaves the seller free to postpone indefinitely the exchange of his money for his ultimate satisfaction in the shape of goods. The vital effects of postponed spending, of saving, were not understood. In particular the effect of underspending on the national income—our aggregate income—was not recognised. It was not appreciated that the national income can rise only if someone spends more and fall only if someone spends less. There was a confused identification of the separate acts of saving and investment (spending). In dispersing this confusion lay the clue to the unemployment problem.

Unorthodox people were, however, stressing the need for more spending both to cure unemployment and to utilise 'the unclaimed wealth'—to banish 'poverty in the midst of plenty'—not always with due regard to the difficulties which emerge as a state of full employment is approached. There was often undue optimism, too, as regards the effect of money

creation on the taxpayers' burden (even if bank-money creation were also harnessed in relief of taxation, as was proposed). Yet the official view, as stoutly maintained by the Treasury, was that little or no employment could be created by state borrowing or expenditures. It was not until Keynes in 1936 pub. his great work *The General Theory of Employment, Interest and Money* that first the academic world and then official circles began to show serious interest in the practicability of governing aggregate spending and so sustaining employment and the general income. In his book Keynes pays tribute to Malthus, Gesell, Hobson and others. He refers indeed to 'orthodoxy having no valid reply to much of (the) destructive criticism' of Maj. Douglas, of Social Credit fame. In 1944 the Brit. Gov. White Paper on Employment Policy officially accepted the obligation to ensure adequate spending. Moreover in the same year by the Bretton Woods Agreement (q.v.), a United Nations Conference agreed that 'The purposes of the International Monetary Fund (include) the promotion and maintenance of high levels of employment and real income . . . It may be objected that the International Monetary Fund pronouncement looked to 'the expansion and balanced growth of international trade' to contribute to this end rather than the reverse; but the Havana Charter for an International Trade Organization (March 1948) goes further. The Charter's first objective is 'To assure a large and steadily growing volume of real income and effective demand, to increase the production, consumption, and exchange of goods, and thus to contribute to a balanced and expanding world economy.' Further quotations emphasise that it is not a question merely of the expansion of international trade contributing to high employment and income in individual countries but that the argument is now firmly put the other way round:—

Article 2 states that 'The Members recognise that the avoidance of unemployment or underemployment, through the achievement and maintenance in each country of useful employment opportunities for those able and willing to work and of a large and steadily growing volume of production and effective demand for goods and services, is not of domestic concern alone, but is also a necessary condition for . . . the expansion of international trade, and thus for the well-being of all other countries' and that 'The members recognise that the avoidance of unemployment or underemployment must depend primarily on internal measures taken by individual countries . . .'; while Article 3 states: 'Each Member shall take action designed to achieve and maintain full and productive employment and large and steadily growing demand within its own territory . . .'

The discovery of the practicability of a country deliberately maintaining its total spending and income is the outstanding achievement of modern E. and it is a matter for satisfaction that this great

international trade document embodies the idea in such substantial fashion. The idea that each and every nation could, and should, 'assure' its income and effective demand—effective spending—could not have been included in an international instrument at the end of the First World War. But it was the experience of the First World War and its aftermath of unparalleled unemployment that led the way to the solution of the problem of recurrent unemployment.

It will be convenient to consider the Gold Standard before pursuing the question of Free Trade versus Protection. As stated above we have twice left the Gold Standard since early 1914. The £ is now 'pegged'—other currencies too—and we hear of 'scarce dollars.' The Gold Standard did not peg the £ but, by its adjusting mechanism, kept it steady within narrow limits. Under the Gold Standard if £s looked like being scarce abroad, a loan from London soon put matters right. A nation on the full Gold Standard buys and sells gold freely and arranges that its currency unit shall contain a certain fixed amount of gold. Britain was on such a standard before the First World War, the gold content of the sovereign being about $\frac{1}{4}$ oz. If wages and prices were too high, imports rose and exports fell off; the £ fell to its lower limit, where it became profitable to export gold; the Bank rate was raised and in the first place attracted gold and in the second place, protected the Bank of England's gold reserves, on which the nation's money and credit structure was based, by setting in train a long-term deflationary effect that has the result of reducing wages and prices and making Brit. goods again competitive in the world's markets. Not every Bank rate rise, of course, was held long enough to have the secondary effect. The great advantage of the Gold Standard was that the merchant worked on the confident expectation that (e.g.) the £ would be worth 25.22 francs year in year out and that the effective price of goods ordered now would be unaffected three months, six months or more ahead by the rate of exchange. Under a Free Exchange on the other hand, while the merchant's requirements may be satisfied by the device of buying forward exchange, this solution is not available for long-term loans. While, however, under the Gold Standard the long-term lender may get his proper interest and return of cap. In full gold value, the value of gold itself has over the years varied considerably.

There are modifications of the Gold Standard (i.e. Gold Bullion Standard and Gold Exchange Standard) and at the opposite pole—the Free Exchange, with inconvertible paper currency. A paper £ not convertible into gold would exchange for what it was worth from day to day—the rate at any time depending on the number of pounds actually and prospectively on offer and demand. Features of such a Free Exchange are:—(1) Free Exchange acts as a sort of tariff. If we over-import the exchange goes against

the £ and so discourages imports and encourages exports. This is what is wanted and the remedy has the advantage of being automatic and immediate. (2) The brunt of the adjustment is borne by the buyers of the foreign goods whereas the brunt of the Gold Standard adjustment tends to fall on workers thrown out of employment. (3) We retain budgetary freedom: we can decide on deficit financing in pursuit of full employment; and we can aim either at a stable £—buying always about the same amount of goods—or a £ which will buy more goods as science and machinery increase production. Under a Gold Standard a nation's freedom to indulge in deficit financing is limited, and it must 'keep in step' as regards what its unit will buy: it must be careful to avoid any risk of inflation as distinct from reflation. (With a universal currency a nation loses all budgetary freedom. Universal currency—i.e. a single currency for the whole world—has an attractive sound and is to-day being suggested as a cure for our currency and trade troubles. A European currency is an alternative suggestion with similar disadvantages.) The 1914 war forced Britain off the Gold Standard (along with other nations) although formally the break did not come until 1919. A paper currency was introduced and, since the heavy war expenditure was covered only in part by tax and loan, the number of £s steadily increased—the value of each £ decreasing of course as the total issues rose. Had it been practicable to pay the full costs of the war by means of taxation and savings the paper £ could have retained its full value. In fact the value of gold itself had fallen in May 1920 to 10 per cent of its 1913 value. It rose steeply soon after.

The word 'profligating' will recall the high prices that prevailed after the 1914-1918 War; but the gradual increase in goods aided by a deflationary policy raised the value of the £ until in 1925 it could 'look the dollar in the face' and Britain returned to the Gold Standard but not to a gold currency; i.e. to a Gold Bullion Standard. This was in line with the recommendations of the Genoa Conference of 1922. Assuming the wisdom of an early return to the Gold Standard it remains a question whether it was wise to have imposed deflation with all its dread effects on trade and whether instead of making the £ look the dollar in the face it would not have been better to have reduced its gold content. It was generally accepted that after 1925 our trade was labouring under the handicap of an over-valued £. Relief was to come in the 'economic blizzard' of 1931-1932 when Britain was forced off the Gold Standard after making the most strenuous efforts to avoid that contingency. No sooner were we off the Gold Standard (Sept. 21, 1931) than it was discovered that exchange freedom has its compensations—in particular it was found that our main suppliers were most anxious to continue to supply their best customer and were prepared to accord us the most favourable

terms rather than lose their traditional market. The freeing of the exchange was soon followed by an expedient which bid fair to give us the best of both worlds: the Exchange Equalisation Account was established. This provided a fund to steady the exchange by ironing out minor fluctuations. It seemed to offer the quick 'natural protection' of the Free Exchange with as much steadiness as was permitted by underlying conditions. In fact, the E.E.A. perhaps aimed rather at holding the rate than at merely ironing out temporary fluctuations. In 1936 came the Tripartite Agreement with the U.S.A. and France, aimed at maintaining the basis of international exchange. France was one of the few countries still on gold after 1931 but was finally forced off in 1936 (following the enactment of the 40-hour week), its trade having grievously suffered from the franc's over-valuation. The U.S.A. had itself in 1933 deliberately devalued the dollar—the oz. of gold making \$35 instead of only \$20.67. Meanwhile Hitlerite Germany was manipulating its exchange to provide marks at different rates according to the purpose for which they were to be used.

The Second World War broke out in 1939 and soon led to the pegging of the leading currencies—the £ at 4.03 dollars. It had been pegged in the First World War at 4.76 dollars (falling afterwards below 3.50 dollars) but much had happened since, including the dollar devaluation. Again, the nations failing to pay their way with taxation and savings, the end of the war found all the participants with depreciated currencies in terms of goods. The £ declined to 4/7 of its pre-war value—as measured by wholesale prices. The Cost-of-Living Index did not measure the fall in value since many of the prices were controlled and subsidised. After the First World War we set about raising the value of the £ and after much effort and many changes in Bank Rate succeeded in restoring the Gold Standard. After the Second World War the position is very different and is dominated by the International Monetary Fund (I.M.F.). Bank Rate has been kept at the 'cheap money' rate of 2 per cent since 1939 and the £ continues (under the I.M.F.) to be pegged at \$4.03. The I.M.F., whose main purpose is to keep exchange rates stable, or reasonably stable, requires every member country to fix the par value of its currency in gold, or gold dollars. The I.M.F. is clearly inspired by the Gold Standard but, with its machinery for co-operative action, is far removed from the old Gold Standard system, with each country managing its own affairs albeit with regard to the 'rules of the game.' In the past, while all Gold Standard nations might be faithfully keeping in step, the value of gold itself might be unstable—might be going up or down—with good or bad results. Under Article IV, Section 7, the I.M.F. should be able to counter this outstanding defect in the old system. The I.M.F. aims at sustained national incomes all round and its machinery is there both to reduce the need for

internal adjustments and to cushion them when inevitable. In the old days unemployment was often the adjusting factor for an over-valued currency and if the I.M.F. plays a major part in promoting less harsh methods of adjustment it will have deserved well of mankind. Adjustment there must be. No country can go on indefinitely living beyond its means. Equally, no country can, without serious effects on world trade, go on living below its means unless it is prepared to give away the surplus, and that promptly.

Through the International Monetary Fund and the Havana Charter, the United Nations are attacking unemployment throughout the world and through the I.M.F. they are seeking exchange stability by means short of returning to the pre-war Gold Standard. In both the I.M.F., and the Charter the United Nations have as a prime objective the expansion of international trade. Multilateral trade is the ideal and reciprocal or bilateral trade only be countenanced in so far as it can justify itself. The simple pre-war issue of Free Trade versus Protection has become more complicated. Multilateralism combats not only high tariffs but other trade barriers of all kinds, a whole paraphernalia of restrictions—quotas, subsidies, exchange controls, etc.—which, along with state trading, have grown up since 1914. In 1914 men were asking themselves whether the lead which this country had had in international trade—first in the field with the Industrial Revolution—was not already far spent and, if so, how this island was to modify its policy or practice to meet the situation. The Free Trade answer is not in doubt—if one trade can no longer stand up to foreign competition, even with full efficiency, then resources must move to other trades that can. Arguments for and against Free Trade went largely into cold storage during the First World War; although in 1915 the McKenna duties on luxuries made a breach in the Free Trade position. After the war international trade was over-shadowed by the problem of reparations—‘making Germany pay.’ There were conflicting aims—keeping Germany economically weak enough to prevent her making war again and getting her economically strong enough to pay large amounts in reparations. Moreover the problem of unemployment was there to bedevil the reparations question—while there was a general demand that Germany should not escape paying tribute, no one was anxious that she should supply goods which might threaten employment in his own trade. After a short post-war boom a deflation policy brought this country prematurely back to the Gold Standard in 1925. In 1929 a financial crash in the U.S.A. ended a long run of prosperity there, and led to the biggest slump in history in 1931–32. Unemployment rose to record heights in this country, but was far worse in the United States. In the general *saucis qui peius* nations made what arrangements they could to protect their trade with little regard for the truism that a world reduction of imports is a

world reduction of exports. Britain, which was still substantially a Free Trade country although a number of protective tariffs had been introduced since 1914, was impelled to impose a general tariff on manufs. and to extend Imperial Preference. In Germany the severe unemployment helped the rise of Hitler who soon had the country at work preparing for war and whose bilateral arrangements with neighbouring countries gave ‘bilateralism’ a bad name.

Trade generally was improving haltingly when rearmament, soon followed by the Second World War, again began to take charge of the industrial situation.



Press Portrait Bureau

LORD KEYNES

The First World War had seen total war for the first time—nations mobilising all their industrial strength in the struggle for victory. The Second World War was to see this carried to even greater lengths, with the nations geared to war as never before. The resulting distortion of the world's economy together with the heavy destruction of cap. left an economic problem of the first magnitude—a problem superimposed on the general problem of Free Trade versus Protection which had perforce been shelved during hostilities. One aspect of the general problem had grown to disturbing proportions. The primary countries of the world are no longer content to be merely the world's producers of food and raw materials: they want to develop manufs. of their own.

This tendency, greatly developed under the stress of two World Wars, makes an obvious problem in adaptability for predominantly manufacturing countries like the United Kingdom.

The U.S.A. which has supplied prodigious quantities of war material to the Allies emerged from the war as the outstandingly rich country in contrast to the impoverished countries of Europe. Lend-Lease ceased abruptly in 1945 at the end of the Jap. war; but was followed by loans from the U.S.A. and Canada followed in turn by Marshall Aid (European Recovery Programme) from the U.S.A. which looked to see the countries of W. Europe standing on their feet by 1952. But 'America helps those who help themselves' and the benefiting countries were urged and helped to restore both their industry and their mutual trading. At America's suggestion an Organisation for the European Economic Co-operation (O.E.E.C.) was set up for this purpose; and was intended at the same time to continue as a permanent body.

The Amer. loan to this country (£938 millions) was not granted without conditions. The U.S.A. besides being anxious to see the world again 'on gold' was keen to push multilateral trade as against reciprocal trade such as Imperial Preference and to reduce or abolish restrictions in general. A policy on these lines is embodied in the Bretton Woods trade agreements (International Monetary Fund and International Bank) and the Havana Charter for an International Trade Organisation.

Freedom of Trade with exchange stability is in the Brit tradition, but our acceptance of the Bretton Woods agreements and our endorsement of the U.S. 'Proposals' which led to the drafting of the Charter were in fact conditions of the loan. The International Monetary Fund aiming at exchange stability is discussed above. The International Bank makes or guarantees long-term loans for the development of resources of particular regions in the general interest. The Havana Charter provides for the establishment of an International Trade Organisation whose aim besides the assurance of income and demand, and the fostering of general economic development is to promote good commercial practice generally and in particular 'To promote on a reciprocal and mutually advantageous basis the reduction of tariffs and other barriers to trade and the elimination of discriminatory treatment in international commerce.' The Charter is not yet ratified. A Geneva Agreement on Tariffs and Trade made preliminary rules which—with cuts in tariffs and preferences—are meantime accepted by many leading countries.

In sum, the Free Trade versus Protection problem has emerged from the Second World War very much the child of events. The U.S. sees her multilateral trade ideals being substantially accepted by the United Nations in conference and is at the same time providing W. Europe with the means to repair the devastation and distortion of war and

approach a state of sufficient economic normality to allow of such ideals being put more fully into practice. On the one hand the world is paying tribute to the ideals of multilateralism, on the other the countries of W. Europe in particular are bending their energies to increase their exports and reduce their imports so as to secure a balance; and, since multilateralism cannot be relied upon to close the import-export gap, restrictions on imports and reciprocal arrangements to ensure exports have never been so rife. It is true that the international agreements themselves recognise fully that the world is in no condition for immediate multilateralism and provide for return to normality only as conditions permit. If some countries have an excess of imports it follows that other countries must have an excess of exports. The U.S.A. is outstandingly such a country and if the rest of the world is to reach normality, must herself close that gap either by gifts (as now) or loans or by increasing her own consumption of imports.

Multilateralism has suffered one notable setback. Britain had been able to pay for much of her war effort by the accumulation of sterling balances, to the extent of over £2000 millions, and was as a further condition of the U.S. loan to make sterling convertible at what proved to be a far too early date. A Brit. memorandum to O.E.E.C. (Cmd. 7572) stated: 'The impossibility of maintaining the convertibility of sterling which was attempted in 1947 made it necessary to embark upon a system of bilateral agreements in order to secure the continuance of as large a volume of international trade as possible.'

It emerges that the real test of how far multilateralism can be pressed to solve the trade problems of the world—even the world outside the E. European countries under Soviet influence—is postponed. In Soviet Russia, now one of the world's leading industrial countries, the state plans all activities. Socialism too—the faith of a few enthusiasts in 1914 but now holding the reins of gov. in this and other countries—is a planner of domestic trade. Since planned domestic trade would seem to march with planned foreign trade it may be that present bilateral arrangements will tend to persist. In any case the conquest of unemployment cannot fail to ease the effects of too little multilateralism—or too much; 'conquest in principle' rather, since it is too much to hope that the new technique will be applied without a hitch. Moreover, it has its own problems. Apart from danger of inflation there is also the danger of impaired incentive—although employment well below 100 per cent is consistent with the conquest of unemployment. Social security, too, has its risks of impaired incentive; but on the other hand, it helped to sustain spending-power here in the 1931-32 slump and may be deliberately used to sustain it in future. Trade unions exist for the protection of their members' best interests. Acceptance of multilateralism with mobility of labour

requires trade unionism as a whole to take the widest views of the means of achieving this protection. Both trade unionism and socialism must face and solve the incentive problem. Between the wars there was 'poverty in the midst of plenty'; to-day the war has abolished plenty; and even to-morrow a good day's work will be an essential of 'plenty' under any régime. Memories of unemployment die hard: perhaps ten years' experience of 'full employment' will be necessary before people realise that to work 'all out' is to benefit one's neighbour and not to endanger his livelihood.

Bibliography.—Adam Smith, *The Wealth of Nations*, 1776 (modern ed. Everyman's Library, 1910; ed. by Edward Cannon, 1923); T. R. Malthus, *Essay on the Principle of Population*, 1798; D. Ricardo, *Principles of Political Economy*, 1817 (and Everyman's Library); J. S. Mill, *Principles of Political Economy*, 1844; H. George, *Progress and Poverty*, 1879; H. Sidgwick, *The Principles of Political Economy*, 1883; A. Marshall, *Elements of the Economics of Industry*, 1899; Karl Marx, *Das Kapital*, 1867 (trans. from the third Ger. ed. ed. by F. Engels, 1938; Everyman's Library, trans. by E. and O. Paul, with introduction by G. D. H. Cole); L. H. Haney, *History of Economic Thought*, 1911, 1922; J. M. Keynes, *Economic Consequences of the Peace*, 1919; A. Marshall, *Principles of Economics: An Introductory Volume*, 1920; L. V. Birck, *The Theory of Marginal Value*, 1922; A. Marshall, *Money, Credit and Commerce*, 1923; C. Gide, *Principles of Political Economy*, 1924; R. G. Hawtrey, *The Gold Standard in Theory and Practice*, 1927, 1947; R. H. Soltan, *Economic Functions of the State*, 1931; J. A. Hobson, *Poverty in Plenty*, 1931; A. E. Feaver-year, *The Pound Sterling: A History of English Money*, 1931; A. C. Pigou, *Economics of Welfare*, 1932; L. von Mises, *The Theory of Money and Credit*, 1934; J. W. Scott, *Self Subsistence for the Unemployed*, 1935; W. R. Hiskett, *Social Credit or Socialism*, 1935; J. W. F. Rowe, *Markets and Men*, 1936; A. G. McGregor, *Correct Economy for the Machine Age*, 1936 (3rd Ed.); J. M. Keynes, *The General Theory of Employment, Interest and Money*, 1936; R. T. Ely and R. H. Hess, *Outlines of Economics*, 1937; L. M. Fraser, *Economic Thought and Language*, 1937; F. Haberler, *Prosperity and Depression*, 1937; J. Viner, *Studies in the Theory of International Trade*, 1937; H. D. Henderson, *Supply and Demand*, 1938, 1940; A. Plummer, *International Combines in Modern Industry*, 1938; F. Benham, *Economics*, 1938, 1948; L. Robbins, *The Economic Causes of War*, 1939; N. B. Dearle, *Economics: An Introduction for the Student and for Everyman*, 1939; J. R. Hicks, *Value and Capital: An Inquiry into Some Fundamental Principles of Political Economy*, 1939; F. W. Taussig, *The Principles of Economics*, 2 vols., 1939; M. Briggs and Percy Jordan, *Textbook of Economics*, 1940; L. H. Haney, *Value and Distribution*,

1940; Colin Clark, *The Conditions of Economic Progress*, 1940; G. Crowther, *Outline of Money*, 1941; F. A. Hayek, *The Pure Theory of Capital*, 1941; J. A. Schumpeter, *Capitalism, Socialism, and Democracy*, 1943; Lord Beveridge, *Full Employment in a Free Society*, 1944; E. H. Patterson, *An Introduction to World Economics*, 1947; G. D. H. Cole, *The Intelligent Man's Guide to the Post-War World*, 1947; J. Jewkes, *Ordeal by Planning*, 1948; J. E. Meade, *Planning and Price Mechanism*, 1948; Oxford Institute of Statistics, *Economics of Full Employment*.

Economics and Political Science. The London School of, a school which provides special courses of training for men and women, for examinations in economics and political science, also in commerce and industry. Estab. in 1895, it is suited for business men, civil and municipal servants, journalists, etc. In connection with the British Library of Political Science, courses of lectures are provided on the methods of investigation, etc., and studentships of a value of from £25 to £200 are awarded. Preparation is also given for the B.Sc. and D.Sc. degrees in Economics of the London Univ. The School of Sociology and Social Economics has been merged in the above school. The average ann. number of regular, as opposed to occasional students, is 1000. The increase in recent years of regular students reflects a growing recognition of the importance of the studies in the school.

Later developments include the estab. in 1930 of a Chair of Imperial Economic Relations, and a Research Chair of Social Biology. Another recent feature is the department of Business Administration Research and Training, the scheme of which supplements the general Commercial Degree. A standing committee has been set up to co-ordinate the school's activities with those of the Royal Institute of International Affairs and to act as a centre of communication with similar committees in other countries. The school is situated in Houghton St., Aldwych, W.C.

Economic Warfare. Ministry of, formed on the outbreak of the Second World War, 1939, to prevent vital war materials from reaching Germany. Its counterpart in the war of 1914-18 was the ministry of blockade, but its functions were wider. Control bases were set up at Weymouth, the Downs, Kirkwall, Gibraltar, Aden, and Haifa, at which all shipping bound for the enemy or for neutral ports having access to enemy ter. had to submit to contraband control. The Fr. Gov. used the term 'blockade' for their analogous ministry, which co-operated closely with the M. of E. W. Shipping companies, in order to avoid delay, were encouraged to send advance copies of their vessels' manifests, giving details of all cargo carried, and names of shippers and consignees. One of the chief difficulties of the M. of E. W. was to prevent contraband goods consigned to neutral countries being resold to Germany since it was no part of Brit. policy to ruin

neutral trade with Germany, but only to prevent the entry of essential war materials, such as lead, nickel, copper, fats, etc., and in carrying out this task the M. of E. W. received information from its agents abroad, who reported upon the ultimate destination of contraband shipped to neutrals. While the M. of E. W. was responsible for answering inquiries about ships and cargoes detained by the contraband control authorities, the procurator-general became responsible as soon as the cargo had been seized and applications for release were made to that authority. Applications to bid for prize goods at auction were made to the Admiralty Marshal. Altogether the staff of the M. of E. W. numbered at most about 600.

Economist, *The*, London weekly jour., founded in 1843 'to discuss financial questions in their wider social and commercial aspect.' James Wilson was the founder and editor of it from its inception until 1877, when he was succeeded by Walter Bagehot. *The E.* has always been a force in politics; it was a strong advocate for the repeal of the Corn Laws, and later was opposed to indiscriminate laudation and extension of the railways. General commercial information for the current week is also to be found in *The E.* One of the greatest critiques ever paid to a weekly jour. was rendered to *The E.* at its centenary luncheon celebration in London on Sept. 2, 1943, the guests including representatives of the Brit. dominions, and Indian govs. the Bank of England, and other banks, merchants, railway magnates, economists, authors and the London daily and weekly press. The toast of *The E.* was proposed by Sir Kingsley Wood, chancellor of the exchequer, and seconded by Sir Montagu Norman, governor of the Bank of England, both of whom recalled the name of a former ed., Walter Bagehot, under whose direction the jour. became, what it had since remained, one of our national institutions. Bagehot (said the latter) did more than any other single individual to promote and direct the transformation of the Bank of England into a Central Bank operating as a public institution with a unique function, and he did it as ed. of *The E.*

But, generally, one result of the policy of anonymity is that the world knows very little about the men who, besides the eds., have actually written *The E.* throughout the century. Herbert Spencer was one of the first and most distinguished, Nassau Senior and Sir Robert Giffen are two other distinguished names on record; but the most distinguished occur in the middle period—Herbert Asquith and Alfred Milner. Geoffrey Crowther became ed. in 1938. See Oxford Univ. Press, *The Economist*, 1843-1943, 1943; and *The Economist* of Sept. 4, 1943.

Econonus, or **Econonus**, hilly cape on the S. coast of Sicily, situated between Agrigentum and Camarina. It was the site of a battle fought in 311 B.C., when the Syracusan Agathocles suffered defeat at the hands of the Carthaginians.

Economy, township of Beaver co., Pennsylvania, U.S.A., on the Ohio R., 17 m. N.W. of Pittsburgh. Until 1904 it was owned by a communist sect, the Harmony Society. It came to an end owing to the celibacy of the communists. Pop. 1100. See also RAPP, GEORG.

Ecrins, *Barre des* or *Poiate des*, the termination of the Dauphine Alps. Until 1862 it was regarded as belonging to Mont Pelvoux, but F. F. Tuckett in that year estab. its separate existence. It reaches a height of 13,463 ft.

Ecstasy, or **Trance**, term which can be used to describe a morbid state of mind, or a condition, when the mind, having temporarily lost all self control, is ruled by one idea, object, or emotion. Hysteria and catalepsy are similar forms of the disease, if such it can be called. It often accompanies religious mania, and the patient may lie as in a trance, or be convulsed in movement. But E. in relation to the exalted state of the mystic is not to be confused with trance. On its practical side mysticism maintains the possibility of direct intercourse with the Being of beings or 'Highest'—an intercourse not through revelation or oracles but by a kind of ecstatic transfusion in which the individual becomes a very true 'partaker of the divine nature.' The E. of the mystic is exemplified in the visions of St. Teresa of which she gives an account in her autobiography, and in the beliefs of her coadjutor, St. John of the Cross and of Plotinus.

Eothyma, anct. Gk. medical term applied to a condition of the skin, which at various times and in various languages has had different meanings. It is best understood as an angry-looking sore, the origin of which is due to infection at the start, or later when the surface is broken, as in *impetigo contagiosa*.

Ectropion, curving outwards of the eyelids, resulting from chronic, long-continued irritation. This produces an unsightly condition, which comes under the category of 'blear-eyed.'

Ecuador (so called because the equator crosses it), republic of S. America, bounded on the S.E. and S. by Peru, on the N. and N.E. by Colombia, and on the W. by the Pacific. The boundaries between E. and the neighbouring countries were definitely settled only in 1944, the question having been referred to arbitration. The country is triangular in shape, and may be divided into three sections, the narrow, low-lying coast-land, the mt. region, and the vast plains to the E. These dists may be called the Cis-Andine, Inter-Andine, and Trans-Andine respectively. The prin. peaks of the Andes which are situated in E. are Chimborazo (20,702 ft.), Cotopaxi (19,498 ft.), Cayambe (19,186 ft.), Antisana (18,864 ft.), Iliniza (17,405 ft.), Cotacachi (16,301 ft.), and six others with an altitude of over 16,000 ft. The prin. port of the country is Guayaquil, the cap. and seat of Quito; and Cuenca, Ambato, and Riobamba are important cities. The chief rvs. are the Esmeraldas, the numerous streams that combine to form the Guayaquil; those

flow to the Pacific. Trans-Andine E. is watered by the upper waters of many tribes of the Amazon. The fauna include deer, tapirs, peccaries, parrots, humming-birds, and numerous reptiles; the condor, which inhabits the slopes of the Andes is the most remarkable bird. The climate of the country is hot and unhealthy save in the valleys of the middle region, where it is cool and salubrious. Vast areas of the country are clad in virgin forest, rich in rubber, cinchona, dyewoods, and other valuable timbers. Most of this forest area lies in the Amazon basin, but the Pacific slopes of the Andes up to an altitude of 5000 ft. are also forest clad. In the coastal regions and lower riv. valleys tropical farming is carried on, and cocoa, coffee, cotton, tobacco, sugar, and rice are grown; among the foothills and mt. valleys is land suitable for grazing and dairy-farming and the cultivation of potatoes, cereals, and temperate fruits and vegetables. The output of cocoa, E.'s staple produce, is declining owing to competition, but it is still the most important export. The *Witchbroom* disease, which appeared in 1921 in the cocoa plantations, has had a disastrous effect on E.'s agric. wealth. Coffee, ivory-nuts, wild rubber, rice, caoutchouc, cinchona bark and fruits are other vegetable exports. Panama hats are another article of trade. E. is the world's chief supplier of balsa wood. Petroleum is the chief mineral; considerable quantities of gold are found, and silver, copper, lead, iron, and coal are known to exist; sulphur is another important mineral product. Quicksilver is also mined, and emeralds and rubies are occasionally found. Communications are bad, roads being very poor; there is riv. transport in some dists. and some 700 m. of railroad. There is no state religion, and toleration prevails; education is fairly well provided for, though methods need improvement. There are univs. at Quito, Guayaquil and Cuenca, and a law college at Loja.

The gov. is in the hands of a president, a council of state, a senate, and a chamber of deputies. There are two senators for each of the 18 provs., and a deputy for every 50,000 inhabs. elected by universal suffrage; the president is elected for four years. No privileges of rank or race are recognised. In 1926 an Amer. Financial Mission arrived in E., and made recommendations which were enacted as laws, but these have since been considerably changed. A new customs tariff, prepared by the Mission came into force in 1927, but sev. amendments were made in this tariff in 1935, increasing the duty on numerous articles by 50 per cent, while surcharges were imposed on goods from countries with unfavourable trade balances; and preferential tariffs were also estab. The area of E. cannot be definitely given, but is probably in the region of 175,000 sq. m. The Galapagos Is. have an area of 2868 sq. m. The Incas of Peru conquered this area towards the end of the fifteenth century, and were in their turn conquered by the Spaniards under Pizarro. For 200 years the country remained part

of the Sp. state of Peru; then, in 1822, a revolutionary war gave it independence, it becoming a part of the republic of Colombia. In 1830 there was a civil war in this newly-created republic, and the presidency of Quito became the republic of Ecuador. Warfare arising out of the border question continued, however, between E. and Peru nearly 100 years; and in 1941 Peru invaded the prov. of El Oro. The dispute was settled by the arbitration of Argentina, Brazil, and the U.S.A., and agreement reached in 1912. The pop. of 3,089,000 is composed chiefly of aboriginal Indians, descendants of the Span. conquerors and people of mixed blood. Span. is the language of the country. See L. Ternaux-Compans, *Histoire du royaume de Quito. Traduite de l'Espagnol* (Velasco, *Historia del reino de Quito*), 1840; C. Cevallos, *Compendio del resumen de la historia del Ecuador*, 1885; and *Resumen de la historia del Ecuador* (Guayaquil), 1886; W. Reiss and A. Stübel, *Hochgebirge der Republik Ecuador*, 1892-98; C. R. Enock, *Ecuador*, 1914; B. Niles, *Casual Wanderings in Ecuador*, 1923; V. W. von Hagen, *Ecuador the Unknown*, 1939; A. H. Franklin, *Ecuador. Portrait of a People*, 1943.

Ecumenical, see (ECUMENICAL).
Eczema, see under SKIN—Diseases; (domestic animals, under DOGS and HORSES).

Edam, one of the so-called Dead Cities of the Zuyder Zee, Holland, but still very much alive, with a large Gothic fourteenth-century church, a museum in a house in the likeness of a ship built by a sixteenth-century sea-captain, and a bell tower with a very musical chime. The country round is noted for its cheese, to which the tn. gives its name. Pop. 8000.

Edda ('great grandmother'), the name of two anct. Icelandic works, which are authorities for N. mythology. The first, or the 'Elder Edda,' was compiled during the thirteenth century. It was discovered about 1643 by Brynjolf Sveinsson, who attributed it erroneously to Sæmund Sigfusson, an Icelandic priest (1056-1133). The poems in the compilation date from the ninth, tenth, and eleventh centuries. They are thirty-three in number, and consist of epic tales of the Scandinavian gods and goddesses, and narratives of Scandinavian popular heroes. The verse of the pieces is all typical alliterative Scandinavian poetry; two forms are employed. The first part of the book is written in epic metre, or *kriðubúttir*, the verses in this part are divided into strophes of eight lines. The second part is written in *godhabattir* or didactic metre, and in strophes of six lines. The other compilation of poems, or 'Younger Edda,' was discovered in 1628 by Arngrim Jonsson, and arranged by Snorri Sturluson. The actual date of composition is about 1150. This book may be divided into five portions; it is the princ. authority on N. mythology and poetry. The first part is the preface or *Formall*: this is of a comparatively modern nature, and gives an account of the beginning of the world, etc., on

orthodox Christian lines. The second part is entitled *Gylfaginning*, the delusion of Gylf, and is a kind of prose synopsis of N. mythology. The third part is a continuation of the second; it is entitled *Bragnarökur*, 'the sayings of Brag', which consist of further legends of deities. The fourth part is called *Skaldskaparmál* or Art of Poetry and is a treatise on Scaldic poetry and versification. The last part consists of three poems in honour of Haakon, king of Norway (died 1263), with a running technical commentary, and is entitled *Hattatal*, a system of prosody.

Eddington, Sir Arthur Stanley (1882-1944), Eng. astronomer and physicist, b. at Kendal and educated at Owen's College, Manchester, and Trinity College, Cambridge, where he was Senior Wrangler in 1904 and Smith's prizeman in 1907. He was made a Fellow of his college in 1907, and after seven years' work (1906-1913) as chief assistant at the Royal Observatory, at Greenwich he was elected Plumian Prof. of Astronomy at Cambridge, his tenure of the chair being combined with the directorship of the Univ. Observatory, and elected a Fellow of the Royal Society in 1914. E.'s main work was not that of an observational astronomer, his time at Greenwich being mainly taken up with statistical examinations of stellar motions, and his researches in this sphere led to the pub. of his *Stellar Movements and the Structure of the Universe*, which appeared in 1914. His original fields of research were the investigation of the stellar system, the study of the internal constitution of the stars, the interpretation of the theory of relativity and the estab. of the relationship between atomic structure and cosmogony. In 1916 he took up the study of the radiative equilibrium of the stars and reached the conclusion that big stars were tenuous and small stars dense. One of his most striking discoveries was a correlation between the mass and luminosity of stars (1924): he showed that the absolute luminosity of a star increased with its mass and that the luminosity per unit mass also increased. This law enabled astronomers to calculate the masses of the thousands of stars whose luminosities could be correctly measured. He extended his work to cover the Cepheid variables. He confirmed Einstein's theory of relativity by observation and extended it mathematically. His especial contribution to relativity was a generalisation of Weyl's theory—by which electromagnetic phenomena are included with gravitation in the geometry of the world—giving a conceptual representation of physical phenomena which allowed a new understanding of them. The chief feature of his generalisation is the idea of a unit of interval at every point of space-time; what is called a metre at any place and in any direction is a constant fraction of the radius of curvature of space-time for that place and direction. The last ten years of E.'s life were occupied with research for precise connections between the cosmological constants and those of atomic

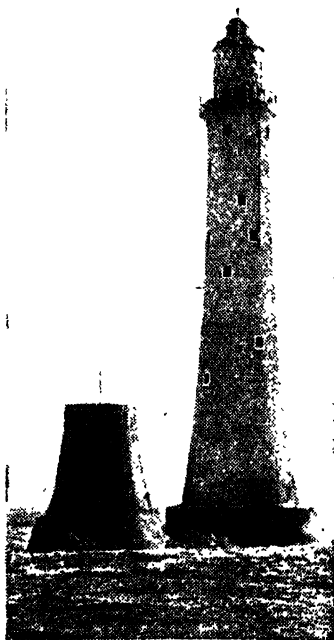
physics and in 1933 he pub. his popular book *The Expanding Universe* in which he developed his views of phenomena that might be expected in a finite expanding spherical universe of the type suggested by Einstein. In 1943 he pub. a complete account of his researches in his lectures before the Dublin Institute for Advanced Studies, entitled *The Combination of Relativity Theory and Quantum Theory*. His great book on the *Relativity Theory of Protons and Electrons* (1936) is controversial and its value cannot be assessed yet; but his adversaries cannot deny his capacity for advancing startling ideas and for the brilliant working out of their consequences. In addition to the above mentioned great books E. was the author of many other works. One of these was *The Nature of the Physical World* which was based on the Gifford Lectures delivered at Edinburgh in 1927 (Everyman's Library, 1935). E. was an accomplished astronomer whose original theories and powers of mathematical analysis undoubtedly benefited his science; he was a brilliant expounder of physics and astronomy with the gift of being able to impart the most abstruse conceptions in the simplest and withal most fascinating language—as may be seen in his *Space, Time and Gravitation* (1920) and *Stars and Atoms* (1927); and finally he was an able interpreter to philosophers of the significance of the most recent scientific discoveries. He received many honours. In 1924 he was awarded the Gold Medal of the Royal Astronomical Society and in 1928 he was the Society's Royal Medallist. Many univs. honoured both him and themselves by the conferring of honorary degrees. He was elected a Fellow of the Royal Society in 1914, knighted in 1930 and decorated with the O.M. in 1938. See A. D. Ritchie, *The Philosophy of Sir Arthur Eddington*, 1948.

Eddoes (E. Indian species of Araceæ), see Cocco.

Eddy, see WHIRLPOOL.

Eddy (Mrs.), Mary Baker (1821-1910), discoverer and founder of Christian Science and author of its text-book, *Science and Health, with Key to the Scriptures*, and other works on Christian Science. Mrs. E., whose maiden name was Mary Baker, was born to Congregational parents of Puritan ancestry at Bow, New Hampshire, U.S.A., July 16. She was thrice married. After a frail youth and middle age, most of which time she devoted to study, writing, and experimenting in the various systems of therapeutics in order to discover if possible the cause and cure of disease, Mrs. Eddy, who was a profound student of the Bible, as the result of the instantaneous healing of the effects of an accident considered fatal, discovered in 1866 what she declared to be the divine principle underlying Jesus's works. On this discovery she founded her healing system and named it Christian Science. In 1875 she pub. *Science and Health, with Key to the Scriptures*, founded the first Christian Science Church, in Boston, Massachusetts, in 1879; estab. successively the Massachusetts

Metaphysical College in 1881, *The Christian Science Journal* (monthly), *Sentinel* (weekly), *Herold* (monthly in German), and *Monitor* (daily). Other writings include *The Science of Man* (1870), *The People's Idea of God and Christian Healing* (1880), *Rudimental Divine Science* (1891), *Church Manual* (1895-1910), *The First Church of Christ, Scientist, and Miscellany*, (posthumously 1913). The most thorough authorised biography of Mrs. E. is that by Sibyl Wilbur, *Life of Mary Baker Eddy* (1913)



Topical Press

THE EDDYSTONE LIGHTHOUSE

In it the reader will find details of Mrs. E.'s early life; of her struggles to gain a hearing for her ideas and her book and to protect them and herself from persistent attacks made from various sources—pulpit, Press, and medical—which involved some misrepresentation of both; of her final triumph in which she saw her Church grow, prosper, and become a power. Mrs. Eddy left the bulk of her estate, valued at \$2,000,000, in trust for the extension and promotion of Christian Science as taught by her. Suits were brought against the executors of her will by a son and adopted son of Mrs. Eddy,

but these were finally withdrawn. See also CHRISTIAN SCIENCE.

Eddystone Lighthouse, light in the Eng. Channel erected to mark a group of rocks which lie in the fairway from the Start to the Lizard, and are visible only at ebb-tide. The lighthouse is situated about 9 m. from the Cornish coast, and 14 m. S.S.W. of Plymouth. The present structure is the fourth which has been erected. The first was in the form of a wooden polygon 100 ft. in height with a stone base; it was built by Henry Winstanley in 1696 and carried away by the storm of 1703. The second was also of wood on a stone base; it was erected by Mr. Rudyard in 1706, was 92 ft. high, and was burned down in 1755. The third edifice was rebuilt by John Smeaton and was built of blocks of Portland oolite encased in granite and dove-tailed together. It was 261 ft. at the base, 15 ft. at the top, and 85 ft. in height. The rock on which it was built was undermined, so the structure was taken down and re-erected on Plymouth Hoe; the first floor was left on its site. The present lighthouse was designed by Sir J. N. Douglas and completed in 1882; its lamp has a dioptric apparatus and gives a light equal to 358,000 candles. The light gives a double flash every half minute and can be seen for 17 m., being 133 ft. above the water.

Ede, James Chuter (b. 1882), Eng. statesman, b. at Epsom, son of a grocer there; educated at local national schools; Dorking High School; and at Christ's College, Cambridge, having won a scholarship from the Battersea Pupil Teachers Centre. Assistant master in Surrey elementary schools until 1914; Assistant Secretary Surrey Co. Teachers' Association, 1919-45. M.P. (Labour) Surrey (Mitcham div.) 1923; S. Shields 1929-31 and from 1935. Home Secretary since 1945. Chairman, London and Home co-ops. Joint Electricity Board 1934-40. President, Brit. Electrical Development Association 1937. For thirty years a co. councillor of Surrey. Not an active Fabian but a great exponent of Fabian political methods. Often called upon to act as deputy leader of the Commons.

Edelink, Gerard (1649-1707), Fr. engraver, b. at Anvers. He was a pupil of Polity. Louis XIV. entrusted to him the execution of sev. important works. He was the first engraver to change the material on which he engraved according to the object represented, so giving tone and colour to the engraving. Among his works, which number over 300, his 'Holy Family,' after Raphael, is one of the best known.

Edelweiss, or *Leontopodium alpinum*, well-known species of Compositae which occurs in its wild state in Switzerland, but can be cultivated in Britain. The dense involucre consists of outer female florets and inner male florets, and these are surrounded by hairy bracts.

Eden, riv. of England, which rises among the Pennines, on the borders of Westmorland and Yorkshire. It flows in a N.W. direction, through Appleby, Eden-

hall, and Carlisle. After a distance of 65 m., it forms a wide estuary at Rockcliffe, in the upper part of the Solway Firth.

Eden, Anthony (b. 1897). Eng. statesman, son of Sir William E., of Windlestone Hall, Bishop Auckland. Served in the war of 1914-18, on the staff of Gen. Plumer, being wounded during the Ger. offensive of 1918. After the war he went to Oxford Univ. In 1923 he was elected M.P. for Warwick and Leamington, which constituency he still (1949) represented. Parl. under-secretary for foreign affairs in the first National Gov., having rendered good service at the abortive Disarmament Conference. Lord privy seal, 1934. On the reconstruction of the National Gov. in 1935, he was appointed minister for League of Nations Affairs, and took a leading part in the Brit. efforts to follow the policy of collective action against Mussolini's aggression in Abyssinia. On the resignation of Sir Samuel Hoare after the rejection of the Hoare-Laval Pact on Abyssinia, E. replaced him as foreign secretary. Sponsored and carried out the policy of non-intervention in the Span. civil war; but in 1938, he resigned as a result of differences of opinion with the Prime Minister, Mr. Neville Chamberlain, over proposals for an Anglo-Italian pact. (See also *EUROPE—History*.) In 1939, on the outbreak of war with Germany, he was recalled to the ministry, becoming secretary of state for dominion affairs. He flew to Egypt in 1940 to receive the Australian and New Zealand Expeditionary Force on its arrival at Alexandria. He was appointed secretary of state for war in Mr. Winston Churchill's cabinet (May, 1940), but became in the same year foreign secretary again, which office he held until 1945, when the Labour gov. assumed office. In the most critical years of the existence of the League of Nations, before the outbreak of the war, E. tried to avert war by bringing the machinery of the League to bear against Germany and Italy. His campaign failed in those days of 'realistic views', about the Ger. and Its., but the principles for which he fought then were those for which he worked throughout the war. With no taint of Chauvinism, he is a stout defender of what the Brit. Empire and the Commonwealth have done for the world.

Eden, George and William, see AUCKLAND, BARON.

Eden, Garden of (Heb. 'delight'), the Biblical first home of man, and the dist. in which the Garden of Paradise was situated. There has been much discussion regarding the exact site of Eden, and many futile efforts have been made to reconcile the mythical geography of Genesis with modern knowledge. Recent discoveries, however, have shown that *Edin* was the Sumerian name for the plain of Babylon, and at the S. end of it was the city of Eridu, and near it a beautiful garden containing the Tree of Life. The accepted modern location appears to be El Qurnah, in Iraq. It would seem, from all accounts, that the Garden was in Eden, and the riv.

with its four heads, spoken of in Genesis, must have been the Persian Gulf, which the Babylonians regarded as a riv. The idea of the 'tree of life' situated in the Garden of Eden would appear to have existed in the *Vedas*, in which the first man is represented as leading men to the garden of immortality where he dwelt in fellowship with the gods. It may also be traced in Babylonian and Assyrian monuments; but the idea of the primeval state of man, as in the biblical account of Paradise, is of a more religious and ethical nature than any of the earlier forms. See the commentaries on Genesis and F. Delitzsch, *Wo Lag das Paradies*, 1881, and *Im Lande des einstigen Paradieses*, 1903.

Edenbridge, mkt. tn. of Kent, England, 10 m. W. of Tunbridge Wells. Haver Castle, near by, was the home of Anne Boleyn, and is now the country seat of Maj. Astor, owner of the *Times* newspaper. Pop. 3000.

Edenhall, vil. and mansion in Cumberland, England. The vil. is situated on the R. Eden, about 3½ m. N.E. of Penrith. The mansion is the family seat of the Musgraves. There is a spring in the grounds named St. Cuthbert's Well, around which a pretty legend is told, connected with an anct. goblet, called the 'Luck of Eden Hall'.

Edentata, order of mammiferous animals characterised by the absence of teeth in the front of the jaws and by the simple structure of their cheek-teeth, which are composed solely of ivory and cement, without any trace of enamel. They are of a low degree of organisation, although many of them are specialised for particular modes of life. All Edentates are either aboreal or terrestrial, and sev. of animals. The typical forms of this the carnivorous forms are burrowing order are the sloths, ant-eaters and armadillos.

Edenton, city of N. Carolina, U.S.A., co. seat of Chowan co., with many historic associations. On Oct. 24, 1774, fifty-one ladies at the 'Edenton Tea Party' signed resolutions that they would not use tea or anything manufactured in England until the tax on tea should be repealed. The royal governors lived here. During the eighteenth century the N. Carolina Legislative Assembly met here, and many important statesmen lived near E. Pop. 3500, of whom one half are negroes.

Ederle, Gertrude, Amer. swimmer, the first woman to swim across the English Channel, which she did from France to England in 1926 in 11 hr. 34 min.

Edessa: (1) anct. city of Asiatic Turkey, the modern Urfa. In 137 B.C. the cap. of an independent kingdom, it was made trib. to Rome; later it was a seat of Christian learning between the fourth and fifth centuries. From 1097 until 1144 the Crusaders held it, and it was destroyed in 1147 by the Turks, into whose possession eventually it came. The modern tn. is surrounded by walls and a moat and has an anct. citadel, and is in the centre of a wheat industry. Pop. 35,600. (2) Splendidly situated tn. of Greece, cap. of the

prov. of 'Pellis on the railway from Salonika to Monastir, with 13,000 inhabs.

Edfu or **Idfu**, tn. of Upper Egypt, situated on the W. bank of the Nile, in lat. 24° 59' N. It is the anc. Apollinopolis Magna, and is noted for its remarkable sandstone temple of E., which is the most complete Egyptian temple existing. It was begun by Ptolemy XIII. in 57 B.C. and took over 180 years to complete. It is approached by two great pylons of great antiquarian interest. The tn. of E. stands 484 m. S.S.E. of Cairo, and has manufs. of earthenware. Pop. 15,000.

Edgar, or **Eadgar** (c. 942-975), surnamed 'The Peaceable,' an A.-S. king, succeeded at the age of seventeen to the kingdoms of Mercia and Northumbria, but enlarged his dominions by degrees until he ruled over all Britain. In spite of the war-like propensities of his neighbours he lived in peace, hence his title of 'The Peaceable.' Yet he was a man of unbridled passions when once aroused; he snatched Wilfreda from her convent by force, and later killed Athelwolda the husband of Elfrida, because he stood in the way of his desires. During his reign wolves were largely destroyed in England.

Edgar Atheling (fl. 1066-1107), grand-nephew of Edward the Confessor. In spite of being the heir-presumptive, he was thought by the witenagemot to be too young on the death of Edward. They accordingly chose Harold, Earl of Godwin, to succeed; Harold was slain at the battle of Hastings, and E. was thereupon chosen king by the citizens of London. As soon as Wm. the Conqueror appeared in England, however, E. placed the crown in his hands, and retired into obscurity, from which he emerged only to place one of his nephews on the throne of Scotland.

Edgumbe, Sir **Edward Robert Pearce** (1851-1929), Eng. politician, traveller, and writer. Was pioneer of the small holdings movement. His works include: *Zephyrus, or Travels in Brazil and on It. Plata* (1887), *Popular Fallacies regarding Bimetallism* (1895).

Edgehill, hilly ridge in Warwickshire, England, 7 m. from Banbury. It is noted as the scene of the first battle of the Civil War in 1642. A huge figure of a horse is cut out on the hillside, and the spot is called the 'Vale of the Red Horse.'

Edgeworth, Henry Essex (1745-1807), known as 'Abbé Edgeworth,' b. at Edgeworthstown, Ireland, where his father was rector. In 1748 the latter was converted to Catholicism and went to Toulouse. E. entered the priesthood, and when he was ordained took the surname of De Firmont. He was made confessor to the Princess Elizabeth in 1791, and in 1793 to her brother, Louis XVI., whom he attended to the scaffold. In 1796 he went to England, and was made chaplain to Louis XVIII., who was in exile there. He died at Milan of a fever caught whilst attending the Fr. prisoners.

Edgeworth, Maria (1767-1849), Eng. novelist, b. at Hare Hatch, near Reading, was the daughter of Richard Lovell E., an author of some note in his day, by the first of his four wives. She does not seem

to have had any precocious call to letters, but in 1782 she translated Madame de Genlis' *Adèle et Théodore*. In London, where her early years were spent, she mixed with her equals; in Ireland, where she spent the next years, she acquired a considerable knowledge of the habits and ways of thinking of the peasantry; and her acquaintance with these sections of society was useful to her when she began to write fiction. Novels, however, were not her earliest literary output. Her first publ. was *Letters for Literary Ladies* (1795); her second, 3 vols. of stories for children entitled *The Parent's Assistant* (1796). In 1800 she pub. anonymously *Castle Rackrent*. Her *Popular Tales* appeared in 1804, and then came a succession of books, *Leonora* (1806), *Tales of Fashionable Life* (2 series, 1809, 1812), *Falconer* (1814), *Harrington and Ormond* (1817), and *Helen* (1834). She was a friend of Walter Scott, who much admired her Irish characters, and declared that it was after reading her books he set himself to do for the Scots what she had done for the Irish. Her works on education had a considerable vogue, and the popularity of her children's stories endures to this day. See studies and lives by Helen Zimmern, 1883, and E. Lawless, 1904; A. J. C. Hare, *The Life and Letters of Maria Edgeworth*, 1894; A. Paterson, *The Edgeworths*, 1914; S. H. Romilly (ed.), *Romilly-Edgeworth Letters*, 1936.

Edgeworth, Richard Lovell (1744-1817), Irish writer, father of Maria E. Remarkable for his powers of mechanical invention. He was a member of the last Irish Parliament before the Union. He educated his children in the spirit of Rousseau's teaching, and wrote on *Practical Education* (1798) in collaboration with his daughter.

Edgren, or **Edgren-Leffler**, **Anna Carlotta** (Cajanello, duchess of) (1849-92), Swedish authoress, b. at Stockholm. She married Judge E. in 1872; he did not share her advanced views, and she obtained a divorce in 1889. In the following year she married Pasquale del Pezzo, duke of Cajanello. She pub. her first vol. of stories in 1869, entitled *By Chance*; later she wrote plays, of which the chief are *The Struggle for Happiness* (1887) and *How One Does Good* (1895), etc. All her works reflect her keen observation and her modern views; her dramatic method may be said to lie between Ibsen and Strindberg.

Edgware, vil. of Middlesex, England, lying partly within the Hendon U.D. and partly within the Harrow U.D., 11 m. N.W. of London. A portion of the old Watling Street crosses the par. and it is said that Handel composed his *Harmonious Blacksmith* one rainy day in a forge which once stood in the vil. Pop. 5000.

Edict of Nantes, edict signed by Henry IV. of France in April 1598. It allowed the Huguenots free exercise of their religion, gave them definite rights of public worship, threw open to them all the offices of state, and estab. a Protestant chamber in the Paris Parliament, and

joint chambers in the local govs. This measure did much to promote the concord and prosperity of France, but unfortunately, in Oct. 1685, Louis XIV. formally revoked it. As a consequence religious rivalry was again stirred up, riots took place, and 400,000 of the most intelligent and industrious section of the community had to flee the country. They settled down in Protestant countries, many in Holland and Great Britain, and

tion attached is sent to the keeper of E. Cs. at the Edinburgh General Register House.

Edinburgh, cap. of Scotland, and one of the most anct. and finest cities in the United Kingdom. It is situated within 2 m. of the S. shore of the frith of Forth, 390 m. N. of London, and 105 m. from Aberdeen. Three eminences which run from E. to W. form the site of the city, which is surrounded on all sides, save the



C.O.I. : Crown copyright

PRINCES STREET, EDINBURGH, FROM THE EAST

On the left is the Castle, and in the centre the Scott Monument.

were an acquisition to whatever country they went.

Edicta (Lat. *edicta*), were proclamations made by all the higher magistrates at Rome, such as the praetors, tribunes, curule aediles, censors, etc. All these had the *ius edicendi*, and made known on their entry into office certain rules which they proposed to follow in administration. Since they had the *ius dictio*, the praetors in particular developed new legal principles in their edicts, and the latter played an important part in the evolution of the Rom. law.

Edictal Citation, term of Scots law used to describe a citation where personal service of the summons is impossible, as in the case of a non-resident debtor. Originally a proclamation was made, and an edict or order of the court was posted up in a public place. Now, however, a copy of the summons with a schedule of the cita-

N., by hills. The steep ridge descending from the castle rock to Holyrood constituted the anct. city, and on it the High Street is built. To the N. of this ridge was formerly the Nor' Loch. The New Town lies on the ground which rises beyond the valley of the Nor' Loch, now occupied by Princes Street gardens and railway lines. As viewed from the Calton Hill, the following is a bird's-eye view of the city. On the right may be seen the New Town, with its wide streets and stately houses stretching down towards the shore. Princes Street, nearly a m. long, lies opposite ; whilst the serried masses of houses forming the Old Town stretch on the left as far as the castle. There are still further streets on the S. towards the Braid Hills, and on the E. to Arthur's Seat ; whilst the northward view from the Calton Hill includes Leith, the frith of Forth, and the hills of Fifeshire. The valley which

formerly was the Nor' Loch, separates the New Town from the Old Town. The former occupies a ridge which is broader and not so steep as that which forms the site of the Old Town. The slopes on both sides of the hollow are laid out as public gardens. This quarter of the city has many attractions, though it does not possess the historical character and interest of the older portion of the town. The streets and squares are well planned, and the buildings, most of which are built of a handsome white freestone which is quarried in the vicinity, are magnificent. The extensive pleasure grounds in this quarter of the city are another attraction. The most noteworthy streets in the New Town are Princes Street, George Street, and Queen Street, which all run parallel to each other, eastward and westward. At the W. end of Princes Street are the Caledonian Railway Hotel and Station, St. Cuthbert's Church, and St. John's Episcopal Church; at the E. end are the Waverley Station and Hotel, one of the largest in Great Britain, the General Post Office, and the Register House (1774). Calton Hill forms the E. extremity of the street; this is a rocky eminence studded with monuments, including the Nelson Column and the unfinished National Monument. Salisbury Crags, a huge belt of precipitous rock nearly 580 ft. in height, rises beyond the E. extremity of the city; whilst behind this is Arthur's Seat, a conical hill, roughly in the form of a lion, 822 ft. high, with a narrow rocky summit. On the slopes of the Calton Hill are situated the Royal High School (founded in c. 1518), the Burns' Monument, and St. Andrew's House, a modern building occupying the site of the old county prison, the headquarters in Scotland of the Scottish Office. George Street, which is bounded by St. Andrew Square and Charlotte Square, has many fine statues and houses with literary associations. Queen Street contains the National Portrait Gallery and Antiquarian Museum, presented by J. R. Findlay; charming views of life may be obtained from its cross streets. The Water of Leith at Canonmills and Stockbridge forms the boundary of the New Town; many famous buildings and places are situated in this neighbourhood, including Donaldson's Hospital, Fettes College (founded 1870), and Stewart's College (founded 1855). A feature of E. is the number of Georgian buildings in the old town. This may be seen in the work of Robert Adam which includes a large part of the univ., the N. side of Charlotte Square (recently restored to its original state), the tomb of David Hume, and the Register House.

The prin. street in the Old Town is that built on the steep ridge which extends from the castle rock to Holyrood. This old street is more than a mile in length, and is called, at different points, Canongate, Netherbow, High Street, Lawnmarket, and Castle Hill, the whole being often termed 'the Royal Mile.' The aspect of this backbone of Old E. is quite in keeping with its traditions; the houses are all very anct. and very lofty. The High

Street opens into Parliament Square on the right hand side, going E.; the latter contains the old Parliament House and St. Giles' church, a large and anct. edifice in the later Gothic style of architecture, which was renovated in 1830. The anct. cross of E. which was removed in 1756, but in 1885 was restored at Gladstone's expense, now stands near the E. end of the church. The site of the Netherbow port, one of the anct. gates of the city, is a little further on, adjoining the house in which John Knox lived. John Knox's grave is situated in the graveyard cemetery near Parliament Close, to the rear of St. Giles'. Many other historic sites are situated in the High Street, including Burns's lodgings, Riddell's Close, Ramsay Lodge, Flesh-market Close, Old Fishmarket Close, and World's End Close. Past the Netherbow the street is called the Canongate; at one time all the nobility of E. lived here, and the Moray House and the Huntly House still remain. The Old Canongate Tolbooth and the Canongate church may also be seen in the Canongate; the closes off this street are as historically interesting as those of the High Street, though at the present time it is hard to realise its former splendour. The closes are numerous narrow lanes which descend laterally in regular rows from the main street; they are not as a rule more than six feet wide at the entrance, and those which admit of the passage of a carriage are called 'wynds.' The old street called the Cowgate runs to the S. of and parallel with the High Street, and opens at the W. end into the Grassmarket. 'The Palaces of the Cowgate' was a common term in olden times, as the palaces belonging to the princes of the land were there; it is now noted mainly for old-clothes shops. George IV. Bridge and South Bridge cross the Cowgate at a height of two or three stories; the univ. is the chief ornament of the latter, whilst the Carnegie Free Library stands on the former. The castle of E. is one of the most interesting of the public buildings. The fortress contains accommodation for 2000 soldiers. The old piece of ordnance called 'Mons Meg,' built of malleable iron casks, stands on a small flagged area which occupies the summit of the castle. The earliest portion of the castle, the old Parliament Hall, was restored in 1888-89; the room in which Queen Mary gave birth to James VI. is situated at the E. end of the S.E. side of the castle. Holyrood Palace, standing at the lower end of the street leading to the castle, does not date in any part from earlier than 1528, whilst the greater portion of it was built in the time of Charles II. The apartments occupied by the hapless Queen Mary are in the N.W. angle of the building. The ruins of the chapel belonging to the Abbey of Holyrood, founded by David I. in 1128, adjoin the chapel of Holyrood Palace on the N. side. The Parliament House, the building in which the Scottish Parliament met before the Union, is a magnificent hall, with a lofty roof, and contains various marble statues of celebrities. The Advocates' Library founded in 1683, and since 1925

the National Library of Scotland, and the Signet Library are adjoining buildings to the Parliament House.

Among the other noteworthy public buildings of E. are the Royal Institution, the National Gallery, the Surgeons' Hall, the General Post Office, the Museum of Science and Art, the Theatre Royal, the Tron Church, the Bank of Scotland, and the Royal Astronomical Observatory. The monument to Sir Walter Scott, situated on the S. side of Princes Street, and designed by G. M. Kemp, is the finest in the city. The seated figure of Scott is of marble and the monument is in the form of an elaborate Gothic cross 200 ft. in height. Other monuments in the city are to Burns, David Hume, Allan Ramsay, James Watt, Livingstone, William Pitt, Dugald Stewart, John Playfair. The Scottish National War Memorial was opened by the Prince of Wales on July 11, 1927. The actual memorial, which reposes in a Shrine in a noble structure on the apex of the rock on the site of the old barracks, consists of books containing the names of over 100,000 Scots who fell in the First and Second World Wars. The E. Cenotaph or Stone of Remembrance was unveiled by Prince Henry the same year.

The most important industries of E. are brewing and distilling, for which it has been noted for more than 200 years, and printing and publishing with the connected industries of paper-making, book-binding and map-making. Other manufs. are rubber, biscuits, hosiery, and knitted goods, paper-making machinery and electrical appliances. Lesser manufs. include rope and sail cloth, glass and sealing wax. There is shipbuilding and ship-repairing at Leith, which was incorporated in the city of E. in 1920. Nearby is the Turnhouse Airport. Several magazines of a high standard have been, or are, pub. in E.; the *Edinburgh Review* (1802), *Blackwood's Magazine* (1819), and *Chambers's Journal* (1832) were all started there.

The educational and cultural sides of E. are the most important; in addition to the univ. (for which see separate article) it has many schools. Amongst them may be mentioned the College for educating theological students of the United Free Church, the Edinburgh High School, Edinburgh Academy (1824), Fettes College (an endowed high school), Loretto School, near E. (founded 1827), and the training colleges for teachers. The Heriot Trust and the Merchant Company are represented by such institutions as the Heriot-Watt College (1885), the Heriot Technical School (1885), George Watson's College (1738), Merchiston Castle (1833), and the Queen Street and George Square colleges for ladies. A notable event in the cultural life of E., and indeed of Great Britain, is the E. Festival, first held in 1947. The city returns six members to Parliament (including the member for Leith), has an area of 32,402 ac., and a pop. of 408,500 (estimated). The city is governed by a tn. council of 71 members.

The advisory committee on city development, appointed by the E. Corporation

in 1943 to report on the general considerations governing the development and redevelopment of E. as the cap. of Scotland and the preparation of planning schemes, recommended for immediate action: the creation of self-contained communities, each flanked by main roads, each with its own school, open spaces, shopping centre, etc.; the estab. of an industrial estate organisation to attract new industries to the E. area and to encourage existing industries; the selection of a site for at least one aerodrome for E.; the selection of a central bus station; a scheme for unifying the academic area of the city instead of leaving the univ. (like that of London) permanently broken into widely scattered and separate parts; the selection of a suitable design for the Princes Street frontage and the conversion of the present frontages of the shops and other premises to that design; and the reconstitution of the High Street and Canongate area. In brief, the Committee recommended that E. should emulate the example of 1752 (when the creation of the New Town was initiated) and at the same time profit from the lessons of its defects. Their report places housing in the forefront and points out that to cope adequately with the problem of over-crowded and slum houses a detailed survey of the city is called for. In opposing an extension of the city's boundaries, the Committee says that from its inquiries, it considers that a city of half a million persons forms a sufficiently large local gov. entity. On the subject of Princes Street, the committee says: 'In the minds of many the jumble of buildings along this street is now irremediable. But in our view the site is of such importance that an attempt should be made to solve the problem. . . that new design should avoid the monotonous uniformity of the original and the chaotic confusion of the modern frontage. We further recommend that ultimately the Corporation should promote a re-designing of the whole of the Princes Street frontages as was done in Regent Street, London.' To meet the cost of reconstruction the report recommends the creation of a reservation trust with power to raise the necessary funds to finance the schemes.

The origin of E. is involved in obscurity, like most tns. whose hist. extends for a long way into the past. The most probable account of the origin of the name E. is that it was derived from the Northumbrian King Eadwine; it had obtained the name Eadwinesburg or Edwinesburg as early as the beginning of the seventh century. After this time very little is known of the hist. of E. until the reign of Malcolm Canmore (the son of Duncan I.), when Donald Bane besieged E. Castle after Malcolm's death. In the year 1128, E. is called by David I. 'his burgh of Edinburgh'; David lived more at E. than his predecessors had done, and this custom was followed by his descendants. By the treaty of Falaise, in the reign of William the Lion, E. was ceded to England, but was restored as part of Ermengarde de Beaumont's dowry when she married Wm.

Though E. had been frequently used as a royal residence, it was by no means the cap. of the country yet. King Robert Bruce held a parliament at Holyrood in 1327, and his last parliament was held in E. in the following year, but the chief importance of the tn. was from a military point of view. E. was held by the Eng. for sev. years, but with the outbreak of war between England and France in 1338, the Scots gained their lost ground. A new era began for E. with the accession of James I. E. may be called the cap. of the Stuarts; it shared the vicissitudes of that dynasty, and sank into comparative unimportance when they deserted it. It was not a walled tn. until the middle of the fifteenth century. The first printing press was erected in the beginning of the sixteenth century; in the succeeding reign E. was recognised as the undisputed cap. of the country. At an early period of the Reformation E. was converted to the Protestant faith; and in succeeding ages the great majority of its inhabitants adopted the Calvinistic creed and adhered rigidly to the Presbyterian form of worship. The Union of England and Scotland aroused great excitement in E., and attempts were made to intimidate the members of the Scottish Parliament who were favourable to the Act of Union, but the Act was eventually passed without bloodshed. An unsuccessful attempt was made by the Jacobites to surprise the castle in the rebellion of 1715. In 1745 the Jacobites were more successful, and were masters of the tn. from Sept. 15 to Oct. 31, but could not reduce the castle. The Porteous affair of 1736 was a remarkable occurrence; the populace lynched the captain of the guard, Porteous, who had fired on the crowd and killed six persons. The city was ordered to pay £2000 to the widow of Porteous; the ringleaders were never discovered. In 1779 a mob burnt one Catholic church and plundered another during the parliamentary discussions on the subject of Catholic claims. The societies which were formed in E. about the time of the Fr. Revolution in sympathy with the principles prevailing in France were put down with great severity. George IV. visited E. in 1822, and won great popularity by wearing the Highland dress. He was the first sovereign to visit the city since 1650. Holyrood was granted as a residence to the exiled King of France, Charles X., in 1830, and in 1842 Queen Victoria and Prince Albert visited the city. See O. Smeaton, *The Story of Edinburgh*, 1907; G. Home, *Edinburgh*, 'Mine own Romantic Town,' 1927; R. Chambers, *Traditions of Edinburgh*, 1929; K. Grierson, *Things seen in Edinburgh*, 1925; Rosaline Masson, *Edinburgh*, 1931; I. Lindsay, *German Edinburgh*, 1948; Chiang Yeo, *The Silent Traveller in Edinburgh*, 1948; S. Sitwell and F. Bamford, *Edinburgh*, 1948.

Edinburgh, Dukedom of, was first conferred in 1786 by King George I. on his eldest grandson, Frederick, who became Prince of Wales on the king's death 11 months later, but did not live to wear the crown. The choice of the title was no doubt influenced by the fact that the

much more historic Scottish dukedom of Albany (which had been borne by Darnley as King Consort) was still vested in George I.'s brother, the bishop of Osnaburg. The dukedom having merged in the Crown by the accession of Frederick's son as George III., an earldom of Edinburgh was subsequently held by two Hanoverian dukes of Gloucester, and the dukedom itself revived for Queen Victoria's second son, Alfred, in 1866 (see ALFRED ERNEST ALBERT). It became extinct by his death in 1900, his only son having predeceased him, and he was succeeded as duke of Saxe-Coburg by his nephew, Leopold Charles, Duke of Albany (see ALBANY, LEOPOLD GEORGE DUNCAN ALBERT, DUKE OF). The title of duke of Edinburgh was again revived in 1947, being one of those conferred, together with the prefix 'His Royal Highness,' on Lieut. Philip Mountbatten, R.N. (formerly Prince Philip of Greece and Denmark, which title he relinquished on being naturalised in Feb. 1947), on the occasion of his marriage (Nov. 20, 1947) to Princess Elizabeth, the elder daughter of King George VI. and Queen Elizabeth and Heiress-Presumptive to the throne. The other titles conferred on him at the same time were baron Greenwich and earl of Merioneth, one of the new dignities, therefore, being derived from England, one from Scotland and one from Wales. The heir to the dukedom (and second in succession to the throne) is Prince Charles Philip Arthur George, b. Nov. 14, 1918.

Edinburgh Review, The, or Critical Journal, Whig quarterly, founded in 1802 by Francis Jeffrey, Sydney Smith, F. Horner and Henry (afterwards Lord) Brougham. Smith gives this account of its beginning: 'I proposed that we should set up a Review. This was acceded to with acclamation. I was appointed editor, and remained long enough in Edinburgh to edit the first number of the Review. The motto I proposed for the Review was: "*Tenui Musam meditatur arem*" (We cultivate literature on a little oatmeal). But this was too near the truth to be admitted; so we took our present grave motto from Publilius Syrus ("*Julex damnatur cum nocens absolvitur*"), of whom none of us had, I am sure, read a single line.' It was the earliest of the great reviews, and has had a far-reaching influence on literature and politics. Sydney Smith was the first editor, and he was followed by Francis Jeffrey (1803-29), Macvey Napier (1829-47), Professor Empson (1847-52), Sir G. C. Lewis (1852-55), Henry Reeve (1855-95), A. R. D. Elliot (1895-1922), and H. Cox (1922-29). Its early literary criticisms were amazingly savage, notably in the case of Wordsworth and Southey, and gave rise to Byron's satire, *English Bards and Scotch Reviewers*. It ceased pub. in 1929.

Edinburgh University, the youngest of the Scottish univs., having been founded in 1582 by a charter granted by King James VI. of Scotland. In 1621 an Act of the Scottish Parliament ratified the charter and granted the univ. all the privileges and immunities which were enjoyed

by the other univs. in the kingdom; this Act was confirmed at the time of the Union. In 1858 the Univ. Court and a body of curators were created, and various regulations were made for governance and discipline. The university is a corporation, consisting of the chancellor, the lord rector, the principal, the professors, graduates, and undergraduates. Its gov. is in the hands of the Univ. Court, the Senatus Academicus, and the General Council. The lord rector is elected by the undergraduates, the principal is the resident head of the college and president of the Senatus Academicus for life. The Senatus Academicus is composed of the principal and the whole body of profs., as well as a certain number of Readers and Senior Lecturers. There are six faculties at the Univ.: arts, science, divinity, law, medicine, and music; the arts and medical courses having the greatest number of students, music the least. Among the principal univ. buildings are the Old College, dating from 1789; the Univ. New Building (School of Medicine) built between 1878 and 1883; the McEwan Hall (1888-1897); the King's Buildings (chemistry) begun in 1919 and completed in 1924; the depts. of agriculture, forestry and entomology, erected in 1914; and the Engineering Dept., opened in 1931. There are also dissecting rooms and 28 laboratories, mainly medical; the Royal Botanical Garden, a natural hist. museum, anatomical museum, and about a dozen smaller specialised museums. The Library contains about 400,000 printed vols. and 8000 MSS., many of which are of great value. The separate Theological Library has 10,000 vols., and there are about a dozen departmental libraries. Numerous bursaries and scholarships are given, many being restricted to students bearing a particular Scottish surname or residing in a certain locality. The univ. unites with St. Andrews, Glasgow, and Aberdeen as one constituency to send 3 members to Parliament. The rector, elected in Oct. or Nov. by matriculated students, holds office for three years. Mr. Winston Churchill was elected Rector for the period 1929-32. Sir J. Donald Pollock was elected in 1939 and re-elected in 1942. Lord Tweedsmuir (John Buchan) was chancellor from 1937 till his death in 1940. Mr. Alastair Sim, the actor, was elected chancellor in 1949.

Edinburghshire, see MIDLOTHIAN.

Edingen, see ENGHJEN.

Edirne, formerly Adrianople (Gk., city of Hadrian), is in European Turkey, at the confluence of the Tunja and Maritza (anc. Hebrus). The Rom. emperor Hadrian embellished it and gave it his name; from 1361 to 1453 it was the residence of the Turkish sultans. It was occupied by Russians (under Gen. Diebitsch) in 1829, and again in 1878. The mosque of Sultan Selim II. is a magnificent building, while the mosque of Sultan Mourad I. and the bazaar of Ali Pacha are worthy of note. Its manufs. are silk, wool, cotton, perfumes, and it has some dye-works and tanneries. During the Balkan war it was besieged and taken

by the Bulgarians and Serbians, but in spite of the treaty of London, it remained in the hands of the Turks. By a secret treaty between the Central Empires and Bulgaria, the latter, as the price of her entry into the First World War on the side of those Empires, was promised, at the expense of Turkey, a strip of land along the Maritza, controlling both that riv. and A. Restored to Turkey after the war. Pop. (village) 185,000; (tn.) 36,000.

Edison, Thomas Alva (1847-1931), Amer. inventor, b. at Milan, Ohio, was of Dutch origin on his father's and Scottish on his mother's side. Beginning life at the age of twelve as a newsboy on the Grand Trunk line running to Detroit, he owed all his distinction and advancement to his own faculties. After printing and circulating the *Grand Trunk Herald*, the first newspaper to be issued from a railway train, he eagerly assimilated the principles of telegraphy from a friendly station-master. From 1871 he was superintendent to the New York Gold and Stock Company, till in 1876 he set up his own works at Menlo Park, New Jersey. Here his extraordinary inventive genius had full scope. The following is a mere catalogue of some of the more important of his 1000 patents: The duplex, quadruplex, etc., system of telegraphic transmission, the printing telegraph for gold and stock quotations, a microtasmeter (for detection of small changes in temp.), the aereophone, the megaphone, the phonograph, or gramophone, the incandescent light, the kinetoscope, and the carbon telephone transmitter. It was an observation made by E. in one of his experiments, which led to the invention of the thermionic valve, used in radio-telegraphy and radio-telephony. This valve, so essential to radio-telegraphy, was at first known as the 'Edison effect.' E. also invented a system of wireless telegraphy to and from moving railway trains. He is also credited with a part in the invention of motion pictures and the alkaline storage battery. During the First World War he designed and operated benzol plants and plants for carboic acid. See *Dickson, Life and Inventions of Edison*, 1894.

Edmer of Canterbury, see EADMER.

Edmonton: (1) Cap. of Alberta, Canada, on the North Saskatchewan R., an important railway centre with large railway car shops. It is served by twelve branch railways. Market for Central and N. Alberta, N. British Columbia, and N.W. Territories. The prin. industries are meat-packing, coal-mining (1½ million tons per annum), lumbering, building supplies, garment making, manuf. of metal goods, biscuits, chemicals, boats, flour, butter and cheese, etc. The Edmonton City Dairy is the largest in Canada. E. is a great shipping point for livestock, and for seed grain. It is the seat of the prov. univ., and of many colleges. It is surrounded by numerous beautiful lakes and summer resorts. Pop. 79,000. (2) N. suburb of London, 10 m. N.N.E. of Liverpool Street station, situated in the Enfield parl. div. of Middlesex. Charles and Mary Lamb are buried here, and

the poets Keats and Cowper resided in the neighbourhood. The par. church is an anct. structure, containing sev. interesting monumental brasses and tablets. Pop. 80,000.

Edmund, St. (840-870), king of E. Anglia. He succeeded to the throne when quite a boy. In 870 E. fought the Danes, but was beaten and killed. The date of his canonisation is unknown, but his shrine was famous in every part of England, and his saintly reputation extended all over Europe.

Edmund (Rich), St. (1175-1240), Eng. ecclesiastic, *b.* at Abingdon, near Oxford; he studied at Oxford univ., and later in Paris. In 1233 he was elected Archbishop of Canterbury at the suggestion of

Canute taking the north and E. the south. Soon afterwards E. died.

Edmunds, George Franklin (1828-1891), Amer. senator and political leader, well known as a constitutional lawyer. He was a member of the Vermont house of representatives, and a republican member of the United States Senate. In 1883-85 Edmunds was President *pro tem.* of the Senate. He was the author of the Act for the suppression of polygamy in Utah, and of the anti-trust law of 1890.

Edom (Heb. 'red,' Gk. 'Ἰσχυρία'), an extent of country to the S. of Palestine, some 100 m. long by 20 m. wide, extending southwards from the Dead Sea to the gulf of Akabah. Its name is probably derived from the ruddy colour of the sandstone



Canadian Government

PARLIAMENT BUILDINGS, EDMONTON

Gregory IX., and at once leapt into prominence by the outspoken way in which he rebuked Henry III. for encouraging foreign favourites; the king appealed to Rome for a legate who at once opposed and thwarted E. at every point. In 1240 he withdrew to Soissy, and he died the same year. He was canonised in 1247.

Edmund I. (d. 946), king of the Eng. He succeeded to the throne in 940, but had already played a prominent part in the battles of the previous reign. E. had many battles with Anlaf, King of Northumbria, but a reconciliation was brought about by Odo of Canterbury, and Wolfstan of York. In 945 E. ravaged Strathclyde. He was killed by a robber, who had been previously banished from the court. E. was buried at Glastonbury Abbey.

Edmund II. (Ironside) (980-1016) king of the A.-Sa. He attempted to resist Canute when the latter invaded England, but was obliged to submit. On the death of Ahtelred the citizens of London chose E., but the witan elected Canute as their king. There was fierce warfare between the two rivals, until E. was persuaded to accept a reconciliation. He and Canute swore friendship, agreeing to divide the kingdom,

and its name appears thus under an Assyrian form in a tablet of the second century B.C. It was originally inhabited by the cave-dwelling Horites, but it later came into the possession of Esau, who received the surname of Edom, the derivation of the name being made from the red pottage given him by Jacob (Gen. xxv. 29 ff.). The Esauites did not entirely drive out the conquered race, but intermarried with them to a certain extent (Deut. ii. 22 and Gen. xxxvi. 20-21). The relations between the Israelites and Edomites were generally hostile, and the O.T. tradition dates the commencement of this hostility from the time when the Edomites refused the Hebs. a passage through their country to the land of Canaan (Num. xx. 14 ff.). Under David and Solomon the Hebs. brought their anct. foes into apparent submission, but there were frequent rebellions. The Edomites remained subject to Judah until the reign of Jehoram, when they successfully rebelled. But they were again subdued by Amaziah and Uzziah. They regained their freedom after the fall of Judah, and waged war without much success with Judas Maccabæus. They were later completely subdued by John

Hyrcanus at the end of the second century B.C. From about 300 B.C. the E. part had been in the hands of the Nabathæans. After the Rom. Conquest, E., Judea, Samaria, and Galilee were united as a procuratorship under Antipater the Idumean, founder of the Herodian dynasty. The religion of the country was polytheistic. Chief tns: Selah (later Petra), Maon, Punon, and Bozrah (now Buseirah).

Edoni, Thracian tribe noted for some skill in music, literature, and the working of gold and silver. They inhabited the region from Olympus to the Pangean dist.

Edred (d. 955), king of the A.-Ss. The youngest son of Edward the Elder, he succeeded to the throne in 946. In revenge for the inconstancy of the Northumbrians, who after tendering him their submission shortly afterwards broke their pledges and acknowledged Eric Bloodaxe, the Norwegian, for their king, E. ravaged the whole country and enforced compensation. His public policy was greatly influenced by his friend St. Dunstan.

Edriophthalma (Gk. ἑδρία, seat, and ὀφθαλμός, eye) is the name given to a group of crustaceans with sessile eyes, sometimes called the Arthrostraca. They are widely distributed individuals of large size, being four especially in the Arctic seas. The group is divided into three orders: Anisopoda, which contains *Cyamus balenarum*, the whale-louse; Isopoda, containing sev. parasitic genera, both terrestrial and aquatic, as *Cymothoa*, which breeds on fishes, and *Oniscus* and *Porcellio*, the woodlice; and Amphipoda, containing *Gammarus pulex*, the common fresh-water shrimp, and *Talitrus* and *Orchesta*, two genera popularly called 'beach fleas'.

Edrisi, or Idrisi, Abu Abdallah Mohammed El- (1099-1170), Arabian geographer, who under the patronage of Roger II. of Sicily wrote a description of the 'inhabited earth' from observations, and not merely from books. Embassaries were sent into various countries to obtain information which E. inserted in the new geography, entitled *The Rogerian Treatise*. This contained a full description of the world as far as it was known at that time. Little is known of the life of E., but as a courtier of a Christian prince he was regarded by strict Moslems as a disgrace to Islam.

Education. The term E. in the widest sense may be held to include the whole process of development through which a human being passes from infancy to maturity, gradually adapting himself to his physical and social environment; but the more definite sense in which the term is ordinarily employed is restricted to those influences which are *designedly* brought to bear upon the younger by the adult portion of the community for the purpose of maintaining and, if possible, of raising the level of culture attained, and it is to this sense of 'schooling' that we must confine ourselves in this article. In the earliest stage of development of mankind, the training given to the young was of a purely incidental character: manners

and customs were at first acquired by a process of imitation rather than by any consciously designed instruction.

As the arts of life, in the civil and military sphere, became more complex, provision was made for them and with the invention of letters, requiring a special training for the mastery of the symbols, and encouraging the accumulation of knowledge far wider than provided by the immediate environment, schools as formal institutions came into existence. The Jews always held E. in great esteem, and it is probable that instruction in the arts of reading and writing was generally given at a very early period. Moral training and the care of the body were considered of paramount importance. The priestly tribe of Levi had special professional schools, but there is no evidence of schools being estab. for the people until after the captivity, E. being regarded as a family affair, and the father undertaking the duties of teacher. Among the Spartans the E. given aimed simply at the development of soldier citizens. Gymnastics formed the greater part of the training, while music (*μουσική*), including reading, writing, and easy arithmetic represented the intellectual side of the curriculum. The art of stealing was also taught as a training in resourcefulness and judgment; the Spartans believing that any disregard for the rights of others which might result would be outbalanced by the intensely moral and social character of their educational system as a whole. In the *Republic* and *Laus* of Plato will be found a representation of the ideal of E. at Athens, and of the importance given to dialectic and music, and to gymnastic exercises for the body. The moral influence of gymnastics, and especially of music, upon the character was a cardinal feature of Plato's educational theory. There was practically no state regulation of schools for boys until they reached the age of seventeen years, when they entered the *ephebea*. The younger boys were sent by their parents, in charge of slaves, to professional teachers, who were of three kinds: the *grammatis* who taught reading, writing, and arithmetic; the *choristes* who taught singing and playing on musical instruments; and the *paidotribes* who trained the boys in wrestling, boxing, running, jumping, etc. During the early period of the Rom. Republic E. was left entirely to the parents. The boy was taught to read, to reverence the gods, and honour the state, and was trained in hardihood of body. With the influence of Gk. culture schools began to spring up under professional teachers who were for the most part Gks. In these the boy was instructed in the three Rs. by a master known as *litterator*. On attaining the age of twelve or thirteen he was sent to another master, *litteratus*, under whom he studied grammar (including the form and content of literature), poetry, hist., philosophy and Gk. Schools of rhetoric were also estab. restricting themselves to training in oratory, the value of which is insisted upon by Quintilian and Cicero. In Quintilian's

Institutio Oratoria we are given a discussion of the whole of E. from the cradle upwards, from which it would appear that the E. given by the *litteratus* was much as in Eng. grammar schools up to the eighteenth century.

With the rise of Christianity schools were instituted for instructing the young in the Christian faith; the method of teaching was entirely catechetical, and among the early Christians no attention was paid to the cultural studies of the pagan schools. As men of culture were attracted to the Christian church, however, the question of adapting pagan culture to Christianity caused serious discussion. St. Augustine and St. Jerome contended that the study of literature and rhetoric was good so long as kept subservient to Christian life. The contentions which raged fiercely over this question had, temporarily, a very disastrous effect on E. As Christianity grew the old pagan schools gradually disappeared and their place was taken by schools mainly connected with monasteries, which prepared young men for the monastic life. The chief monasteries generally had, however, external schools for pupils not proposing to enter the order, as well as the internal schools for novices. By degrees the curriculum was widened to include the seven liberal arts, relics of the old Rom. E., known as the *Trivium*—grammar, logic and rhetoric (including the study of law)—and the *Quadrivium*—geometry (which corresponded rather more to physical geography than what is now understood by the term geometry), arithmetic, music, and astronomy. The development of city life and trade guilds led to apprenticeship in the arts of the counting house and the workshop. During the latter part of the eighth century the famous palace school (or *Palatine Academy*) was estab. by Alcuin (735–804) under the patronage of Charlemagne. During the eleventh and twelfth centuries, contact with Eastern civilisation, consequent on the Crusades, and with the highly civilised Moors in Spain, produced an intellectual revival which found expression in the formation of many univs., and a great increase in the numbers of, and attendance at the monastic and grammar schools. The desire for E. penetrated even to the lowest classes of the people, and elementary A.B.C. schools came into existence, generally presided over by the parish priest, to give instruction to the children of the poor in reading, writing, and easy arithmetic. The most famous univs. were at Paris—the chief centre for philosophy and theology, which formed the model on which the univs. of Oxford and Cambridge were organised; at Salerno, at which the study of law took first place, and at Bologna, for the study of medicine. The need for acquiring a definite status induced most univs. to apply to the Pope or the Emperor for recognition, though a few of the greater univs. did not find it necessary to do this. Charters were granted by Henry III. to the two Eng. univs., Cambridge in 1231 and Oxford in 1248. The Ger. univs. were of later foundation, and were mostly estab.

by civic authority; Prague was estab. in 1348, and Vienna in 1365, and obtained charters from the Emperor later. Though univs. were intended mainly for more advanced E. of men, the distinction between them and grammar schools was not everywhere clearly marked, and young boys frequently attended.

As has already been noted, the rise of the Christian Church and the barbarian invasions of the Middle Ages had led to a break in the study of classical literature.

Although great attention was paid to logic, scholastic theology, and law, the church discouraged the study of literature as such, and the time given to it, together with free-thinking philosophy and classical philology, was looked upon as wasted. The Renaissance, however, led to a free and unfettered study of all that appealed to the intellect of man. The movement originating in Italy, which consisted in going back to the ancients, and reviving the free study of all classical writers, both Lat. and Gk., assimilating their reasoning, and making a philological study of their language, is termed the *Revival of Learning*. Such literature was styled *litteræ humaniores* and those who advocated its study were called *Humanists*. Vittorino da Feltre (1378–1446) was perhaps the most famous of the early It. humanist schoolmasters. His ideal was the patriotic and well-equipped citizen rather than the self-contained scholar. Another great humanist of the period was Guarino da Verona (1370–1460), who worked under the patronage of the Estes at Ferrara. Classics naturally formed the foundation of the curriculum in the humanist schools. In addition to their value in stimulating literary taste and culture, they provided a disciplinary training much more than at the present day. The grammatical rules had to be acquired from careful observation of the literature read, there being no formal grammars, and plain texts provided a more valuable intellectual study than the modern text-book in which all difficulties are eliminated by the aid of notes. The classics were also looked upon as providing practical text-books, such as Cæsar for war, Virgil for agric., etc. But in addition to the classics, the curriculum embraced mathematics, astronomy, hist. (Gk. and Rom.), music, natural philosophy, and natural hist. The later humanist theories of E., which the schools continued to follow generally for two or three centuries, were taken mainly from Erasmus (1467–1536) and Melancthon (1497–1560). To Erasmus Humanism, which in the eyes of the Its. was an end in itself, was only the means to the propagation of truth. Melancthon was a great supporter of the claim of the classics to impart a culture not otherwise attainable, and was also the author of sev. school text-books. The Lat. *gymnasien*, founded at Strasburg by Melancthon's friend Sturm (1507–89), became the model which the grammar schools of Protestant Europe strove to copy. In this school practically the whole of the time was given to acquiring a mastery of

the Latin language. In England Humanism did not spread so quickly until it was adopted by the univ., where it encountered less opposition than in Germany. St. Paul's School, founded in 1512 by Dean Colet, provided for a distinctively Humanistic E. In Catholic countries the church retained entire control of E., and the Society of Jesus, founded in 1540 by Ignatius Loyola, estab. many schools which were extremely successful. The curriculum in these Jesuit schools was purely Humanistic, and a particular feature was the attention paid to the individual character of each pupil.

While Lat. was accepted as the medium of learning, and so long as new branches of knowledge were not discovered, the schools remained in harmony with the culture of the day; but during the seventeenth century the difference between the needs of life and the E. furnished by the grammar and other classical schools grew gradually wider, and many schools, owing to the rapidly decreasing numbers in attendance, fell into decay. Indeed, in England many of the old grammar schools degenerated into elementary schools of a very poor and inefficient character, and at the beginning of the eighteenth century organised E. was at a very low level. But there was no lack of educational theorists and writers. Comenius (1592-1671), the author of *The Great Didactic: the whole Art of Teaching all Things to all Men* (1657), and a number of text-books on original lines, takes first place amongst the realists, of whom J. H. Pestalozzi and F. W. A. Froebel were latter-day disciples. The realists maintain that things, not words, must provide the organon of E., and that the child must be brought into contact with the concrete before proceeding to the abstract. John Locke (1632-1704) on the other hand is to be classed among the naturalists who hold that the duty of the teacher is to treat the child as an individual who is being prepared for life by living. He does not, however, appear to concern himself with any but the children of the wealthy, for he declares roundly in favour of a home E., under a private tutor, as opposed to that given in public schools. During the eighteenth century E. became more and more to be looked upon as the property of the select few. The individualistic rationalism of Voltaire (1694-1778) and the Encyclopaedists, derived from Locke, resulted in an extreme of selfishness among the aristocratic classes, an example of which may be seen in Lord Chesterfield's *Letters to his Son* (1737-68). In 1762 appeared Jean Jacques Rousseau's famous *Emile*, the underlying motif of which is an appeal for a return to nature. According to Rousseau the essence of life lies in the gratification of desires and impulses of the moment. He would abolish all moral training, and free the child to the reactions of the physical world upon his activities. With all its violent paradoxes *Emile* exercised a wonderful influence on E. Rousseau also made a special plea for child-

study. At this time Pestalozzi (1746-1827) was a young student at Zürich. Though by method a realist, he drew his inspiration from Rousseau, and this early influence is traceable in his ardent belief that an important factor in E. had hitherto been insufficiently considered—the child himself. In spite, however, of his belief in the value of psychology, Pestalozzi made little use of it in his own teaching, in which, indeed, he was thoroughly unmethodical and unpractical. Froebel (1782-1852), however, succeeded in constructing a complete and consistent system for Pestalozzi's scheme. 'The boy,' says Froebel in his *Education of Man* (trans. 1891), 'has not become a boy, nor has the youth become a youth, by reaching a certain age, but only by having lived through childhood, and further on, through boyhood, true to the requirements of his mind, his feelings, and his body.' The duty of the teacher consists in clearing the way for nature to do her proper work: to stimulate and direct the child's self activity, without in any way interfering with it. To this end he devised his scheme of gifts and occupations. Froebel's ideas as regards young children, though his native land has never given him due recognition, have been largely accepted outside his own country.

Similar conclusions—that given the right conditions, children love work as much as play, were reached by Dottorossa Maria Montessori (*q.v.*). The child from its very first years is essentially a spontaneous 'absorber' of what he finds in his environment. In her view, consequently, the art of education consists in preparing for the child a special environment which shall contain what we wish him to absorb in forms found experimentally to hold his attention, and establishing a dynamic relationship between the child and this environment. This involves giving the child freedom to 'live his own life in this experimentally prepared environment free from adult interference in accordance with the laws of development.' Chief amongst the laws of development is Montessori's doctrine of Sensitive Periods. As the child grows he passes through certain stages or epochs, each of which is characterised by a special but transient sensibility to take in mentally certain aspects of his environment. Such for instance is the sensitive period for language which lasts from birth up to about 6 years. During this period the child has power to absorb a language from his environment in all its complexity of grammar and pronunciation 'simply by living,' a feat impossible to the adult. Such again is the sensitive period for 'order' (1-3 years), and for 'social development' during adolescence.

If the child's life is arranged on these lines in accordance with the sensitive periods the whole process of education is transformed. Instead of having a teacher who is constantly drumming information into passive pupils the Montessori system has a 'directress' who protects and supervises the natural flow of children's energies into creative channels. Through

self-activity or auto-education the children, at one and the same time, construct their personality and acquire the elements of culture. Education is thus primarily a help to life. In the Montessori system, every subject which has to be learned (as for instance the 'three R's') is presented through a series of carefully graded occupations, each of which has been determined experimentally by the reactions it

They become quiet, self-controlled and orderly in their movements; serene and joyous in disposition; competition gives place to mutual aid, and the love of possession to a communal respect for a common environment; whilst self discipline takes the place of external control. A practical point is that the Montessori system can be successfully applied to a class of forty children under one directress.



Stevenage Studios, Hitchin

A CLASS IN THE MONTESSORI DEPARTMENT OF ST. CHRISTOPHER SCHOOL, LETCHWORTH

A Montessori classroom creates an environment suited to the needs of the child and provides him with the opportunity for spontaneous activity. The children work individually, the teacher showing the correct use of each piece of didactic apparatus.

evokes in the child. It is the spontaneous and individual activity of the children with these occupations which brings about that concentration on their work which leads to mental development on the one hand and mastery of school subjects on the other. The directress is the 'living link' between the children and the teaching occupations in the prepared environment. It is her function to initiate them into the exact use of the materials. Within well-defined limits (*e.g.* they must not disturb others or misuse the apparatus) the children are free to choose their own occupations and to work at them for as long as they like. It is claimed that this form of education brings about a remarkable change in the character of the children.

The effect of the Montessori movement on modern education in every civilised country has been, and is, most marked. The 'Individual Work System' so prevalent in infant schools to-day is largely the result of it; whilst the Dalton system owes much to the same source. The Froebel methods, however, have found more widespread acceptance for children beyond the 'Kindergarten' (*q.v.*) ages. The Decroly Class system, introduced by the Belgian Ovide Decroly (*q.v.*) differs from the Montessori method in that it does not employ experimentally determined apparatus.

One of the great influences, too, in E. at the present time is that of Johann Friedrich Herbart (1776-1841) the pupil

of Fichte and successor of Kant. The most important of the pedagogical applications of Herbart's opinions are the recognition of the value of apperception, the concentration of studies, and the 'formal steps.' Great importance is attached by Herbartians to what are called the 'five formal steps,' the successive stages in every lesson given in what they consider the only right way: (1) preparation, (2) presentation, (3) association, (4) formulation, (5) application.

Another important recent educational influence has been that of Rudolf Steiner, distinguished founder of Anthroposophy. His pioneer school at Stuttgart (founded 1919) has been the inspiration of similar experiments in many countries, including Great Britain. These schools have had particular success in dealing with mental defectives, along original lines in which the arts are therapeutically employed.

The relation between the state and the individual in the matter of E. has long been a favourite theme of discussion and controversy. It is, however, now generally recognised that the state has the duty of providing and the right of prescribing E. for all its children. Even Adam Smith and John Stuart Mill, the apostles of 'natural liberty' and *laissez-faire*, admitted the exception of E. Adam Smith was in favour of state-controlled elementary E., though he hardly disguised his disapproval of state interference in higher E. Mill, on the other hand, advocated that the state should provide for both elementary and higher E., and that elementary E. should be made compulsory. England for long lagged behind most of the other great civilised nations in this respect, and it was not until 1880 that elementary E. was made compulsory, but secondary E. was left practically untouched by the state until 1902.

The various stages of growth from infancy to maturity require, and have created in most modern civilised states, a graduated system of schools adapted to the needs of each particular period. As has already been asserted, for the sub-primary stage, i.e. during the first six years, the child's proper place is the home, but the complexity of modern life, especially in congested areas, where the mother has to go out to work, has made the kindergarten and infant school indispensable institutions as places of refuge for children whose parents are unable to fulfil their proper parental functions. In England children are permitted, though not necessarily encouraged, to go to school at three years of age; in France there are the *écoles maternelles*, and in America the work of the kindergarten has received the serious attention of many able teachers and educationists. In Germany on the other hand, no official cognisance is taken of children under six years of age. It is generally accepted at the present time, however, that neither at home nor at school should there be during this period any question of formal instruction. The next stage in school life covers the period between the ages of six or seven and thirteen or fourteen. In nearly all

civilised countries compulsory attendance for children between these ages is now enforced. Corresponding to the 'elementary school' of England there is the *Volkschule* of Germany, the *école primaire élémentaire* of France, and the 'common school' of the U.S.A. In these schools the E. given is designed to meet the needs of the poorer classes of the community, who are unable to extend the period of E. for their children. The former higher elementary schools of England the *Höhere Bürgerschule* of Germany the *école primaire supérieure* of France, are designed to continue for one or two years the work of the primary school in a practical direction. Parallel to the public elementary schools there are also in England private preparatory schools of various types, generally designed in order to secure continuity in the course of study for pupils proposing to proceed to secondary schools. These together with the preparatory and junior forms of secondary schools provide primary E. for the children of wealthier parents.

Parallel to the public secondary schools there are the so-called Public Schools, private foundations, often originally of a religious or philanthropic character, some of them of long standing (Winchester 1382, Eton 1440), the majority dating from the nineteenth century. They number about 150; being predominantly boarding schools, they cater chiefly for the wealthier classes. Since 1850 they have been responsible for educating the great majority of Eng. diplomats, lawyers, bishops, high gov. officials, and directors of companies. Features common to them all are religious teaching, corporal punishment, a high regard for team games and the prefect system. Their supporters claim that they are true schools of Christian character, their critics that they make for class-isolation and conventionality of outlook. There are also Public Schools of the same type for girls. Boys and girls remain at such schools until the age of eighteen or nineteen, many of them then proceeding to a univ.; at second-grade schools, the pupils usually leave at sixteen or seventeen. In addition to these two types of secondary school, the public and the Public, there are other schools offering special training for vocational needs: in England the technical and agricultural schools, in Germany the *Gewerbeschulen*, and in America the industrial schools. (For mixed schools and experimental co-educational schools see UNDER CO-EDUCATION.)

GERMANY.—In Germany state intervention in E. began at the time of the Reformation, and towards the end of the sixteenth century two states, Saxony and Württemberg, had organised fairly complete educational systems in connection with the church. The Thirty Years' war had a disastrous effect on E., but in the eighteenth century the state system was revived in the two states above mentioned, and their example was followed by Hanover and Prussia. As early as 1717 a law was in force in Prussia requiring all children to attend school wherever

schools were accessible. In 1806, when Prussia lay at the feet of Napoleon, the control of E. was all that was left to that state by her conqueror, and in response to Fichte's appeal in his *Address to the German Nation*, a thorough system of national E. was founded by von Stein in 1807. In 1850 a law was passed making elementary E. free, and the teaching profession a branch of the civil service. The basis of Ger. elementary E. in its present form is the Prussian Code of Regulations of 1854, as modified by the Falk Laws of 1872 and later laws. Attendance is compulsory on all children between the ages of six and fourteen. By the law of 1920, children must receive a four years' course of instruction in the *Grundschule* or foundation school. The next highest school for elementary E. is the *Volksschule* or people's school, supported partly by the State and partly by the municipalities. Besides the *Volksschule* there is the *Mittelschule* or middle school, in which instruction is given in Eng. and Fr. There are two types of secondary schools, the *Gymnasium* or classical and the *Realgymnasium* or modern school. These again are divided into schools with a nine years' course and those with a six years' course. The *Gymnasien* are the most fully developed classical schools. The *Pro-gymnasien* differ from the *Gymnasien* only in not having the highest classes. The *Realgymnasien* specialise in mathematics, natural science and modern languages, but also teach classics. The *Oberrealschulen* give instruction in mathematics, natural science and modern languages, but not in classics. Two other kinds of schools have been estab. experimentally—the *Deutsche Oberschule* and the *Aufwandschule*, the former to provide intensive E. in Ger. subjects and in languages, the latter an intensive high school to further clever scholars of elementary schools. For girls there are *Lycen*, *Oberlycen*, and various other educational institutions which prepare for the univs. There are a number of technical high schools with the right of granting degrees. All are State-aided.

FRANCE.—In France, as in most Catholic countries, state intervention was longer delayed. Elementary E. was practically non-existent before the Revolution, and the higher schools formed a bone of contention between the church and the gov. The Revolution, however, made a clean sweep, and a strongly centralised system of E. was established. There is now a very complete system of E. under the control of the minister of public instruction. All schools, *primaire*, *secondaire*, and *supérieure*, are examined by the state. The system of elementary E. in force was organised in 1886. Public elementary instruction is free, and attendance is compulsory on all children from 6 to 13 years of age. Teachers, in all but the largest tns., are state servants. Religious instruction in state schools has been abolished and replaced by moral instruction according to official curricula. In addition to the *écoles primaires élémentaires*, there is a very efficient system of

higher elementary schools, *écoles primaires supérieures*, admission to which is accorded only to those who have obtained the elementary school leaving certificate. Secondary E. is carried on at the *lycées*, which are largely subsidised by the state, and *collèges* which are generally maintained by local authorities and are of a second-grade character. In 1902 the scheme of studies was reorganised. The course extends for 7 years, divided into two periods of 4 and 3 years. The first period provides two kinds of curricula: (1) Lat., obligatory, and Gk., optional; (2) No Latin. At the end of the first period a state *certificat d'étude secondaire du premier degré* is granted. The second period provides a choice of four courses: (1) With Lat. and Gk.; (2) Lat. and modern languages; (3) Lat. and science (these three continuing course 1 of the first period), and (4) Modern languages and science, continuing course 2 of the first period. There are also many technical schools and univs.

In Denmark, Norway, Sweden, Austria, Switzerland, Holland, and Belgium, elementary E. is free and compulsory. Switzerland has an admirably organised system, and the management of the schools is in the hands of each canton. Primary and secondary schools are provided in every district, and there are also numerous technical schools and sev. univs.

UNITED STATES OF AMERICA.—E. in America is under popular control, and there is very great local freedom. Each state, and many of the large cities, has its own system, and provides its own schools and teachers. Compulsory attendance is in force in most states. The schools are of three kinds; primary for children from 6 to 10; grammar schools for those between 10 and 14 (these are grouped together as 'common schools') and high schools from 14 to 18. In all states E. in the first two grades is free, and some states provide free E. in the high schools also. The curriculum is very similar to that of Eng. schools, but more attention is paid to hist. and citizenship, and in the high schools physical science and modern languages receive more attention than in secondary schools of the same type in England. The length of the school year varies considerably in the different states, and is generally longer than in England because the school term is nine continuous months with none of the long holiday breaks that are customary in England. The main holiday is for the three summer months, due to the great heat of that period. An interesting plan has recently been adopted by the city of Cleveland, where the public elementary schools are kept open through the summer vacation, and backward children are required to attend for four quarters of the year instead of three to make up their deficiencies. School buildings generally in the U.S.A. are equipped with the most up-to-date educational appliances. Normal schools for the training of teachers are provided by many states, but there is no national standard of qualifications, each state granting its own diplomas, and special training in normal schools is not

necessarily indispensable to obtain these. Many of the states have their own tax-supported state univs. which are free to the youth of the states.

ENGLAND.—In contrast with the complete systems which have been conceived and estab. during comparatively recent times in other countries, the educational system in vogue in England is the result of growth and adaptation, and also particularly of sectarian rivalry to obtain control of the young.

Secondary Education.—Even before the Reformation it seems probable that there was a fairly complete system of endowed schools, and although most were connected with eccles. orders, such as the monastic schools, chantry schools, and choristers' schools, there is reason to believe that there existed also many schools supported by secular foundations. At the Reformation the dissolution of monasteries reduced the number of schools very considerably, many of the schools attached to these institutions perishing irretrievably, though a few lingered on though deprived of their endowments. But the spirit of the Reformation unquestionably inspired a considerable amount of individual educational effort, and many schools were founded, and in many instances the old foundations were renewed. The Act of Uniformity (1662) and the Five Mile Act (1665), prohibiting all teaching in public or private schools, except by Church of England men, had the effect of creating large numbers of private schools, as it was held in the courts that the law could only be enforced in the case of endowed grammar schools. The endowed schools were under the sole control of the church, with the result that at the end of the eighteenth century they were in a worse condition than at any time in their hist. The Endowed Schools Act of 1869 remedied this state of affairs very considerably by the removal of religious disabilities and by widening the curriculum. In 1874 the control of the endowed secondary schools was transferred to the Charity Commissioners. In 1889 the Technical Instruction Act gave powers to county, bor., and urban dist. councils to levy a rate not exceeding a penny in the £ in aid of technical or manual instruction. The Dept. of Science and Art, formed in 1851 to supervise and administer grants to the science and art classes, which were being estab. all over the country, was also aiding secondary E. by grants towards mathematical, scientific, and even literary studies. In 1899 the Dept. of Science and Art was united to the E. dept., which then became the Board of E. with a president and parl. secretary, and the powers of the Charity Commissioners in regard to educational endowments were transferred to this new board, but it was not until 1902 that any real steps towards organising secondary E. were taken. The E. Act of 1902 (repealed by the E. Act of 1921) provided the local authorities with power 'to take such steps as seem desirable, after consultation with the Board of E., to supply or aid the supply of E. other than

elementary, and to promote the general co-ordination of all forms of E.' By the E. Act of 1918 (repealed by the E. Act of 1921) the limit of the rate to 2d. in the £ was repealed, which Act also provided that the state's contribution should not be less than one-half of the approved expenditure of the local E. authority. After the Acts of 1918 and 1921, great progress was made in secondary E. Before then no public provision for secondary E. as such had been made, though indirect financial aid had been given under The Technical Instruction Act. In 1907 greatly increased grants were placed at the disposal of the Board of E. for the purpose of secondary E. In order to qualify for the higher grant which was then offered, schools were required to provide 25 per cent of free places for scholars from public elementary schools. A secondary school, as defined by the Board (prior to the Education Act of 1944) was a school which offered to each of its pupils a progressive course of instruction (with the requisite organisation, curriculum, teaching staff, and equipment) in the subjects necessary to a good general E. on lines suitable for pupils of an age-range at least as wide as from twelve to seventeen. The number of secondary schools recognised as efficient by the Board of E. in the years immediately preceding the First World War included 862 schools in receipt of grants, and 96 schools dispensing with the grant. In 1939 the number of secondary schools in receipt of grants was nearly 1400; the number of full-time pupils in 1937 was 464,000 (53 per cent boys, 47 per cent girls). Of these 76.4 per cent were ex-public elementary school pupils and 46.4 of the total were non-fee paying pupils. Before the Second World War the amount of the grant had been increased from £5 each pupil over 12 years of age to £7; while in addition, there were special grants in respect of advanced courses. Official inspection is an essential condition of the grant and this inspection extended to all the activities of the school. In 1947 there were about 40,000 boys and 30,000 girls at Public and Private Schools. There were 6212 Univ. profs. and lecturers, educating 47,000 men and 18,000 women students at the eleven degree-giving Univs. and five univ. colleges. In addition, there were 117,000 students at London County Council evening classes. There were 145 local authorities administering the public system of E.

Technical Education.—As has already been seen, technical E. since 1851, was greatly assisted by the Science and Art Dept., which instituted examinations in the various branches of technology, but it was not until 1878, with the foundation of the City and Guilds of London Institute for the Advancement of Technical E., that it was organised to a large extent. This institute extended the examinations and estab. many schools and the great Royal College of Technology since incorporated in the Imperial College of Science and Technology (q.v.). The Technical Instruction Act of 1889, giving local authori-

ties permission to raise a penny rate for the purpose and the allocation of 'whisky money' to the extent of three quarters of a million to technical instruction, resulted in the estab. of flourishing institutions



Keystone

TECHNICAL EDUCATION: ASHFORD NORTH COUNTY MODERN BOYS' SCHOOL

devoted to this form of E. all over the country.

Examinations.—The confused and elaborate system of external examination which has gradually grown up to provide a test for the relative efficiency of E. in Eng. secondary schools is the result of state neglect in this as in other depts. of secondary E. The Dept. of Science and Art, founded in 1851, instituted examinations, which were, however, of too specialised a character to affect many schools other than the science schools which that dept. estab. In 1853 a chartered association of schoolmasters, the College of Preceptors, began to examine pupils in Lat., Fr., Eng., hist., geography, mathematics, drawing or one science subject, and Gk., and laid the foundation of much useful effort. In 1857 Sir Thomas Acland and Dr. Temple held an examination at Exeter which proved so successful in its results that in the same year the univ. of Oxford appointed delegates to conduct similar examinations on a permanent footing in the future. Thus were instituted the Oxford Local Examinations, and the following year Cambridge Univ. followed suit. Both univs. issue junior, senior, and honour certificates, open to candidates of all ages (with the exception of honours certificates, which is restricted) and, since 1870, to both sexes. The example of the older has since been followed by the newer univs. The more important secondary schools, however, demanded a more specially directed effort on the part of the univs., and in 1870 the Headmasters' Conference appointed a committee to confer with the older univs. upon

the institution of leaving examinations corresponding to the *Abiturienten-examen*, provided by the state in Ger. This resulted in 1873 in the formation of a joint board granting upon examination certificates exempting pupils from the first or matriculation examination of the univs. In 1878 this examination was extended to girls' schools, and in 1883 a lower certificate for younger candidates was instituted. This examination has perhaps more than any other agency stimulated and raised the efficiency of Eng. Public schools. The Northern Univs. have also adopted a similar plan of an exemption certificate. The Univ. of London, founded in 1846, has also provided by its matriculation examination a recognised certificate, which serves as a preliminary qualification for many professions. The univ. has also done excellent work in the inspection of schools. Following the publication of the Norwood Report of 1941, but largely ignoring its recommendations, the Board of E. proposed some significant changes in the examination system, which were to take effect in 1950-1. The School and Higher Certificates are to disappear, and be replaced by papers at three levels, ordinary (roughly equivalent to School Certificate), advanced (equivalent to Higher Certificate), and scholarship. The most sweeping change is the abolition of the demand for compulsory subjects or groups of subjects—an innovation which the teaching profession greets with general approval though it carries with it certain obvious dangers of specialisation. The least intelligible feature of the new Act is the demand that no pupil shall enter for the 'ordinary' examination before the age of 16, to be increased to 17 when more adolescents stay at school up to that age.

The Spens Report.—Far-reaching reforms in the national educational system were recommended in the Report of the Consultative Committee on Secondary E., with special reference to Grammar Schools and Technical High Schools, issued at the end of 1939 by the Board of E. This report is complementary to the Hadow Report (1926), which dealt with the organisation and curriculum for public elementary schools for children above 11 years of age. The chairman of the committee was Mr. (later Sir) Will Spens and the terms of reference stressed the question of the E. of pupils who did not remain at school beyond the age of about 16. The report contains two major proposals: (1) for the provision of a new type of school—the Technical High School—for boys between the ages of 11 and 16, which will have the same status as a grammar school; such schools would provide courses of study of a realistic and practical character parallel to the existing academic courses of study in the secondary (grammar) schools; (2) for the drastic remodelling of the traditional curriculum of the secondary (grammar) schools. As a first step to establishing technical high schools the report recommends that a number of existing junior technical schools, orientated towards the

engineering and building industries, should be converted into technical high schools of equal status with schools of the grammar school type. Close relations should exist between grammar and technical high schools, so that an opportunity of transfer at about the age of 13 should exist for those pupils whose later development makes it clear that they would be better suited by an alternative form of E. The reforms proposed in secondary E. are based on the assumption that the existing arrangements for the whole-time E. of pupils above 11 years of age no longer correspond with the structure of modern society or with economic realities, and, on this hypothesis, the committee makes, *inter alia*, the following recommendations: the core of the curriculum should be the study of Eng. and Eng. subjects; schools should have a 'careers master'; a 'tutorial system' should be tried in all types of secondary schools; pupils not going to the univs. should be encouraged to stay on at school and special courses should be arranged for them; the School Certificate examination should follow the curriculum, not determine it; all possible freedom should be left to schools to select their studies; all pupils should be given the chance to learn at least one foreign language; Lat. should be taught so that something definite is gained by pupils who do not continue it after 16; mathematics should be taught 'as one of the main lines which the creative spirit of man has followed in its development.' Taught with this purpose, it will not be necessary to devote the time now thought necessary to teach it; aesthetic subjects, including music and art, should have a more prominent place in the curriculum; scripture should be taught primarily to show what the various books of the Bible were in fact intended to mean by their authors for their original readers; specialised vocational training should come towards the end of school life; economics should not be included as a separate subject before the age of 16; no home-work should be set to Junior forms in which most of the pupils are under 11. Finally, it may be noted that the Committee make a number of recommendations with a view to ensuring parity between all types of secondary schools—the principal being the adoption of a new Secondary Code governing all these types of school and provisions that the salary of the teacher shall no longer depend directly upon the type of school in which he or she serves; for the abolition of fees as the national finances render this possible; and an eventual minimum leaving age of 16, as is now the rule in grammar schools.

Elementary Education.—Prior to the Reformation what little E. for the poor existed in Eng. was oral instruction in the doctrine and duties of the Faith, given by the par. priest. The conception of elementary E. adapted to the needs of the masses of the people was unfamiliar, E. being regarded as a privilege of the select few. With the rise of industrialism, however, during the seventeenth century, the

need for some form of elementary E. became very apparent, and a universal system of elementary schools was advocated by Hoole and Petty. In 1699 Dr. Bray founded the Society for Promoting Christian Knowledge, and by 1741 nearly 2000 charity schools had been estab. throughout the country by the agency of this society. In 1784 Sunday-schools were founded by Robert Raikes, which for many years provided all the E., both religious and secular, which many children received. In addition there were numerous private 'schools,' kept by dames who received and 'minded' the children for a small weekly fee. The beginning of the nineteenth century saw the rise of voluntary societies for the E. of the poorer classes, chief among them being the Brit. and Foreign Schools Society and the National Society for Promoting the E. of the Poor in the Principles of the Estab. Church. In 1802 Joseph Lancaster, a Quaker, pub. a pamphlet in which the wretched condition of the schools existing for the children of the poor is described: in this pamphlet he tells how he founded his school in the Borough Road in 1798, and invented the monitorial system, by which the older boys, under his supervision, were organised to teach the rest. About the same time Dr. Andrew Bell had been led to adopt the same method of employing pupils to instruct one another in a school in Madras. From these institutions were founded the Royal Lancasterian Society (1808), later known as the Brit. and Foreign School Society, and the National Society (1811). The National Society had ample funds at their disposal, and their schools were soon spread all over the country. The first real step towards state intervention in E. was not taken until 1883. But in 1839 a committee of Council on E., presided over by the Lord President and four other ministers, was formed to administer par. grants for the purpose of elementary E. in England and Wales. In 1840 the right of inspection of schools was made a necessary condition towards qualifying for a grant, but it was agreed that all Church of England schools should be inspected by clergymen approved by the Archbishop of Canterbury, while the Brit. Schools should be visited by laymen approved by the Society. In the same year a training college for teachers was estab. at Battersea, to which in 1842 grants were obtained from parliament. This college was taken over by the National Society in 1843. In 1853 the Council on E. was formed into the E. Dept. with a staff of officials and clerks, and in 1856 a vice-president of the Council was appointed, who should be responsible to the House of Commons for the distribution of grants, which had until then been dispensed on the responsibility of a departmental committee. In 1882 Robert Lowe, then vice-president of the Council, introduced the famous 'Revised Code,' which made 'payment by results' the basis on which grants were to be made, the test being an examination in reading, writing, and arithmetic. The year 1870 marked a revolution in the elementary

educational system of this country. In that year Mr. Forster, the vice-president of the Council, carried an Act, providing that in any district where, within a certain period, sufficient school accommodation was not provided, a school board, under the control of the E. Dept., was to be formed with power to raise money from local rates for the purpose of supplying such school accommodation. The Act also provided that in all public elementary schools whatever religious teaching was given should be imparted either at the beginning or end of the school session, and that an unbroken period of two hours in each session should be given to secular instruction; in all schools provided or maintained by public school boards religious instruction was to be entirely undenominational in character. In 1876 the power to enforce compulsory attendance became general and the leaving age was raised from 13 to 14, unless the child passed the examination standard for exemption before that age. In 1880 an Act was passed making it compulsory on school authorities to enforce attendance. By the code of 1882 the curriculum of the infant school was enlarged by the inclusion of object lessons and kindergarten occupations; while in the senior schools the grants for such subjects as Eng. hist., geography and elementary science were graduated according to the quality of the instruction given. The general efficiency of the school, as well as the number of passes obtained in examination, was also taken into account in awarding the grant. In the Code of 1890 (which resulted from the recommendations of the Royal Commission appointed in 1886), the grant was based upon the average attendance. The following year elementary E. was made free to all children between the ages of 3 and 14. In 1900 the system of making grants for individual subjects was abolished (except in the case of domestic and manual instruction), and a block 'grant' per head was instituted. The annual examination was also abolished in favour of inspection without notice. By the Act of 1902 (repealed by the Act of 1921 which re-enacted various sections and was itself repealed by the E. Act, 1944) all elementary schools were placed under the local authority: in urb. dists. with a population exceeding 20,000 the urb. council is the local authority for E.; in bors. of more than 10,000 it was the bor. council; and elsewhere the co. council was the authority. The council was required to appoint an E. committee in accordance with a scheme approved by the Board of E. The chief duties of the councils as E. authorities related to (1) the management of schools; (2) the appointment and direction of teachers; (3) financial control over educational machinery. Each school was required to have a board of managers not exceeding six in number, four of whom were appointed by the E. committee of the council, and two by the minor local E. authority (where such existed) in the case of 'provided' schools, i.e. schools taken over from the old school boards; in the

case of 'non-provided' schools four of the managers were appointed under the trust deed of the school and two by the E. authority. In 1906 and 1907 power was given to local authorities to provide for the feeding of necessitous children in England and Wales and for the medical inspection of all children in elementary schools. The Act of 1902 classified elementary schools as 'provided' or 'voluntary,' the former being those built and maintained by the local E. authority. No religious catechism or religious formula which is distinctive of any particular denomination might be taught in a provided school (a prohibition which re-enacted the Cowper-Temple clause, *q.v.*); in non-provided or voluntary schools the character of the religious instruction must be in accordance with the provisions of the trust deed and under the control of the managers (the Kenyon-Slaney clause). In provided schools the teachers are appointed and dismissed by the local E. authority; in voluntary schools, by the managers subject to the consent of the local E. authority.

The Fisher Act.—The E. Act, 1918, frequently called the H. A. L. Fisher Act, repealed in 1921, and re-enacted as part of the Consolidation Act of that year, made several important changes in the educational system of Great Britain. The Act, as shown by its preamble, aimed at 'the establishment of a national system of education for all persons capable of profiting thereby'; and local authorities, called upon to prepare suitable schemes under the Act, were advised to consult parents and other persons locally concerned in order that the most convenient arrangements might be made. The Act also gave local authorities power to establish nursery schools for children from the ages of 2 to 5. The most revolutionary part of the measure was the change in the age for compulsory school attendance. This was not only raised from 12 to 14 years, but powers were granted to local authorities to extend this age to 15 in those places where such an extension might seem desirable. Part-time attendances were entirely abolished, and in order to carry this into effect the Act declared that 'no child should be employed in a factory unless legally so employed.' This section was among those which were not repealed in 1921, but later legislation on the point is to be found in the E. Act of 1944 which empowers local E. authorities to prohibit or restrict the employment of children attending county, auxiliary or special schools where it would be prejudicial to the children's health or E. Provision was made for the estab. of central schools for more intelligent children with the evident intention that there should be a possible avenue for the really brilliant scholar from the humblest position to the univ. Local authorities were also encouraged to provide means by which suitable children could be transferred and prepared for higher E., and with this object in view the Act removed the limit on contributions from the rates for all E. other than elementary. The Act estab.

the principle that E. should not cease before the age of 18, and provision was made for the estab. of schools for young persons between the ages of 14 and 18, the compulsory hours of attendances to be not less than 32 in the year. The Act also urged on authorities the importance of physical training and gymnastics as well as adequate medical supervision. Special provisions were also contained in the Act for the supply and training of teachers. The passage of this Act synchronised with much discussion on the payments and pensions of teachers and in 1920 many changes were made under a National Scheme which improved the outlook of teachers in all state-aided schools, the Burnham Scale of Pay, as the new rates were called from the fact that Lord Burnham (*q.v.*) was chairman of the Scheme. The duty of preparing older children for work in technical occupations has received increasing attention by the educational authorities. Such schools as Sibford School in Oxfordshire where technical E. forms a large part of the curriculum have influenced both elementary and advanced E. (see TECHNICAL EDUCATION). The post-1918 period gave a great impetus to univ. training both in the modern univs. and in the two historic centres of learning, Oxford and Cambridge. Broadly speaking, this new enthusiasm was practically all centred in scientific and practical studies. Great extensions took place in Liverpool, Bristol, Leeds and Manchester, while such cities



Leicester College of Art

THE ARTS

A woman student of bookbinding is turning-in gold lines with a wheel tool or fillet

as Southampton, Reading, Nottingham, and Exeter made definite movements toward securing their own Charters. In any educational review of that post-war period it is important to recognise the great influence of the commercial world upon higher E. (See also ADULT EDUCATION).

Educational reform.—The pre-1944 publicly-provided system of E. in England and Wales was characterised by overlappings and inconsistencies. Nor can

it be urged that it was based on any fundamentally sound principle, even a misconceived one. The outbreak of the Second World War appears to have been a spur to educational reform and it is not too much to say that, despite the distractions of war, public discussion of educational reform went on with such rising intensity in the two years preceding the pub. of the gov. White Paper of July, 1943, that it was certain that a Bill founded on the proposals of the White Paper would meet with little, if any, opposition, particularly as, for the first time since 1870, an E. Bill was projected which was not a mere re-writing of a previous Act. Educational reformers in these years of discussion were quick to point out that the very use of the phrase 'the English educational system' was misleading. We often talk about 'the Eng. educational system' as though it were one and indivisible. Nothing could be farther from the truth. There are in fact at least seven or eight educational systems in the country, each with a different aim and a different ethos (or in some cases no ethos at all), and each unhappily having a different social status. There are the elementary school system, the secondary school system, the technical school system, the Public School system, the private school system, the univ. system, and the adult E. system. Within those systems further subdivisions can be made—almost all based, as are the main divisions, not on educational considerations, but on considerations of social and economic status—and it is equally feasible on the same ground to draw a distinction between the day school system, the boarding school system, and the night school system. It is true that the elementary, secondary, and technical school systems are component parts of the State educational system, but their ideals, their objectives, and their social standing are so dissimilar that it is almost true to say that theirs is little more than an administrative unity. And even that is far from being complete because each of those systems is administered under a different code of regulations prescribing different standards of buildings, amenities, and teaching staff. The state educational system is, truly, 'not so much an organic unity as a collection of parts, each of which retains to a greater or less extent the imprint of the State of social development which attended its birth' (H. C. Dent, *A New Order in English Education*, 1942). As Dr. F. H. Spencer pointed out in an earlier work, 'the truth is that popular education has been successively for the governing class and many others a matter of philanthropy, a measure of 'ransom', an insurance against the dangers of an illiterate democracy, a necessary consequence of developing industrial methods and increasing and transformed office employments. It has never, by our statesmen, been conceived as the most important means among others of producing a noble race. It must be so conceived. Our new society will recognise this, or it will fail and fade like the shadow

of another dream' (F. H. Spencer, *Education for the People*, 1941). The Churchill gov.'s proposals for recasting the E. service of England and Wales, as set out in Cmd. 6458 (pub. on July 16, 1943) recognised the principle that E. is a continuous process conducted in successive stages. The reforms proposed in this White Paper included some to be achieved by legislation and others to be effected by administrative action. The former included: (1) the improvement of the facilities for the training of children below compulsory school age by the provisions of nursery schools; (2) raising of the school-leaving age to 15 without exemptions, with provision for a later raising to 16; (3) completion of the re-organisation of the public elementary schools, so that well-designed and equipped primary schools may be available for all children up to 11, and secondary schools with varied facilities for advanced work, for all children over that age; (4) an amendment of the existing law so as to emphasise the position of religious instruction as an essential element of E.; and to enable the schools provided by voluntary bodies to play their part in the proposed developments; (5) introduction of compulsory part-time E. in working hours for young persons up to the age of 18; (6) provision of adequate and properly co-ordinated facilities for technical and adult E.; (7) extension of facilities for securing the health and physical well-being of children and young persons; (8) introduction of a system of inspection and registration of all independent schools which catered for children of compulsory school age; and (9) adjustment of the existing system of local educational administration to the proposed new educational layout. The changes to be effected by administrative action included: (i) a progressive decrease in the size of classes in primary schools; (ii) abolition of the Special Place examination and adoption of the arrangements for the classification of children when passing from primary to secondary schools; (iii) introduction of a common Code of Regulations applicable to secondary schools of all types so framed as to secure that standards of accommodation and amenities were raised to the level of those of grammar schools; (iv) remodelling of the curriculum of secondary schools; (v) further expansion of the Youth Service; (vi) improvement of the facilities for enabling poor students to proceed to the univs.; and (vii) reform of the methods of recruiting and training teachers. The bases of these proposals were equality of opportunity and diversity of facilities. With these aims in view the gov. proposed that the statutory system of public E. should cease to be severally administered for the purpose of elementary E. and higher E. respectively and should be organised in three progressive stages, to be known as primary, secondary and further E. A duty would be placed on each local E. authority to contribute towards the mental, moral and physical development of the community by securing the provision of efficient E. throughout

these stages for all persons in the area capable of profiting thereby. The parents duty would no longer be confined to causing his child to be efficiently instructed in the three It.'s; it would be to cause the child to receive efficient full-time E. suitable to the child's age and aptitudes. The gov. held that there was nothing to be said in favour of a system which subjected children at the age of 11 to the strain of a competitive examination on which not only their future schooling but their future careers might depend. In future children at the age of about 11 should be classified, not on the results of a competitive test, but on assessment of their individual aptitudes largely by such means as school records, supplemented, if necessary, by intelligence tests, with due regard to parents' wishes and the careers they had in mind. Three main types of secondary schools were proposed: grammar, modern and technical, but these would not necessarily remain separate and apart but different types might be combined in one building or on one site and conditions in the different types must be broadly equivalent. Authorities would be empowered to establish boarding schools and hostels. It was intended that the raising of the school leaving age to 15 should be brought into effect as soon as possible after the war. A duty would be placed on local E. authorities to provide such variety of instruction as might be desirable in view of the different ages and aptitudes of the pupils and of the different periods for which they might be expected to remain at school.

Education Act 1944.—The Bill embodying a great part of the proposals in the White Paper described above was presented to Parliament by Mr. R. A. Butler, president of the board of E., on Dec. 15, 1943, and passed on Aug. 3, 1944. The Act substitutes a ministry of E. for the Board (which of course never met). The minister now has the benefit of the advice of two Central Advisory Councils, one for England and one for Wales, whose duty it is to advise him upon such matters connected with educational theory and practice as they think fit. The new ministry is charged with the duty of securing the effective execution by local E. authorities of the national E. policy, instead of with the mere "superintendence of matters relating to education in England and Wales." This change does not involve any diminution in the responsibility of local E. authorities, to whom wider opportunities will be afforded than ever before. What is involved is a recognition of the principle that the public system of E., though administered locally, is the nation's concern, the full benefits of which should be equally available to all alike, wherever their homes may be. Every child is offered the opportunity to pass through primary, secondary and further stages, the secondary stage being designed to give all children over 11 an opportunity to make the most of their natural aptitudes. Thus the old division of E. into two fields, elementary and higher, comes to an end. Instead, the system of public E. is organised

as a continuous process conducted in three successive stages—primary, secondary and further—and each local E. authority is required to secure the provision of efficient E. at all stages. This change necessitated a revision of the pre-1944 system of local educational administration. That system, established by the Education Act of 1902, provided for two different types of local E. authority—authorities for elementary E. only (certain boroughs and urban districts and councils) and authorities for both elementary and higher E. (county boroughs and councils). In those areas which came under the first-named authorities the responsibility for higher E. rested with the county council. To-day the local E. authority is responsible for all types of E. They now comprise only the county and county borough councils, except where considerations of economy and efficiency make it desirable to combine the areas of two or more county or county borough councils; and in such cases a joint E. board, consisting of representatives of the councils concerned, are established as the local E. authority for those areas. Provision is made for a system of delegation of the functions of the county local E. authority to divisional executives in order to evoke and maintain local interest in E. in the county districts, and schemes for the delegation of functions are prepared by the county councils in consultation with the county district councils, which latter have the right to make representations to the Minister who may modify the schemes. The clauses of the Act dealing with the Dual System (provided and non-provided) and the giving of religious instruction follow generally the lines of the White Paper and indeed to some extent those of previous Education Acts. The financial liability of the managers or governors of aided schools is now limited to half the cost of alterations and improvements of buildings and of external repairs, the remaining half being met by the Minister. In all primary and secondary schools the school day begins with a corporate act of worship and religious instruction is to be given. This instruction may be given at any time. The former statutory provision restricting it, in the case of elementary schools, to the beginning and end of the school session, no longer applies. In the county schools the instruction is in accordance with an agreed syllabus drawn up by representatives of the established Church (except in Wales and Monmouthshire) and other religious denominations, the teachers and the local E. authority. Neither the corporate act of worship nor the religious instruction required to be given may include any catechism or formula distinctive of any particular religious denomination (repeating the Cowper-Temple clause). Parents who wish their children to receive denominational religious instruction may withdraw them for that purpose and it is also open to parents to withdraw their children entirely from religious observance and instruction. In aided schools the religious instruction is still in accordance with the trust deed or previous practice, and under the control of the managers or governors. In controlled

schools (those conducted entirely at public expense) the religious instruction is in accordance with an agreed syllabus. Under the Act of 1944 the Minister is empowered to raise the school-leaving age from 14 to 15 and eventually to 16 (it may be noted that the Education Act of 1936, repealed by this Act, raised the compulsory school age to 15). School authorities are required to provide nursery schools and classes for children from 2 to 5 years before the compulsory stage is reached. Smaller classes are planned for primary schools, and provision made for junior grammar and technical schools. Backward children receive special attention and E. authorities are instructed to provide meals and milk for children under their charge. One of the most important features of the Act, the abolition of school fees, came into force on April 1, 1945. The fees are abolished in all schools that take financial assistance from local E. authorities as distinct from schools that are financially independent and those which take their grant direct from the Ministry; the two latter categories are exempt from the requirement that fees be abolished. But fees may be charged for extra tuition, given in some secondary schools, usually outside school hours, in such subjects as the violin, piano, dancing or elocution. A feature of the new Act is the institution of continuation schools, at first named, in the White Paper (Cmd. 6158) and Bill 'Young People's Colleges,' afterwards amended to 'County Colleges,' where E. is to be continued up to the age of 18. The principles of this institution formed the main innovation of the Fisher Act of 1918, and they were embodied in Sect. 75-79 of the 1921 Act, but were never implemented. Adequate facilities are conferred on E. authorities to provide playing fields and play centres. The barrier against married women teachers is abolished. Managers of denominational schools are given approximately the same powers to borrow money as are conferred on local E. authorities.

Hitherto, broadly speaking, the grammar school has been the only school that offered attractive amenities, such as small classes, playing fields, and well-developed social activities, and this has always been a great incentive to get the child into these schools, whether the academic E. provided was the best for him or not. The abolition of fees, however, will probably change this state of affairs, for the Minister has stated that there are to be secondary schools with all these advantages available for every child, but the school curriculum has to be adjusted in accordance with the child's ability and aptitude. This means that the grammar school will no longer have all the advantages. There will be a levelling up, and the parents of the practical-minded child will no longer have the same incentive to get him into the grammar school because other schools can offer equal amenities with an alternative curriculum—which, however, complicates the problem of ascertaining what the demand for grammar school E. will be.

The provisions creating the Ministry (Part I.) and the supplementary provisions (Part V.) came into operation on the passing of the Act: Part II. (Statutory System of E.) and the general provisions in Part IV., on April 1, 1945; the remaining Part IV. (Independent Schools) come into force on a day to be named by Order-in-Council. The cost of the reforms is reflected in the increasing Estimates: for 1943-44 the total for the Board of E. was £60,075,795; for 1944-45, £61,898,150. The Ministry's estimates for 1945 (including Supplementary Estimates) were: (net) £89,940,780 (of which total, grants to local E. authorities amounted to £31,596,000); the estimates for 1946 were £104,980,112 (grants to local E. authorities being £91,534,000) and for 1946-47 (England and Wales) £173,000,000. For details of finance, see Cmd. 6781 of 1946, H.M.S.O.

WALES.—Until recent years Wales was included with England for the purposes of educational administration, but the remarkable national revival witnessed towards the end of the nineteenth century led to a demand for a national system of higher E., and the Welsh Intermediate Education Act of 1889 provided for the estab. of joint E. committees, nominated by the co. council and the lord president of the council in every co. in Wales, which for this purpose was held to include Monmouthshire. These committees had power to raise money by a halfpenny co. rate, to which was added a treasury grant not exceeding the amount raised, for the purpose of establishing intermediate and technical schools. These E. committees were superseded by the local E. authorities estab. by the Education Act of 1902. The revised regulations relating to secondary schools were applied to Wales in 1908. The system of E. beyond elementary before 1914 was much the same as in England, though the schools were under earlier statutory provision, and were called 'Intermediate' in many cases. There was a Central Welsh Board for Secondary E. A Welsh dept. of the Board of E. was estab. in 1907, with a permanent secretary and a chief inspector. The E. Act of 1944 (Ch. 91) enables the Minister of E. to continue to pay to the Welsh local E. authorities the special grants payable under Sect. 9 of the Welsh Intermediate E. Act, 1889. Consequent on this and other changes the Act of 1944 includes provisions for preserving the existing financial position of the Central Welsh Board.

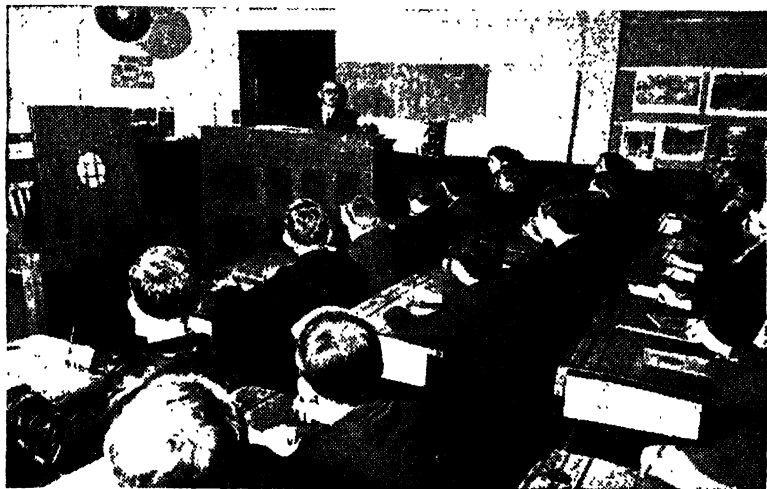
IRELAND.—In Ireland state intervention in E. began with the foundation of schools by the Elizabethan gov. in pursuance of their Anglicising policy. Until 1802 there was a great lack of local effort in E., but in that year the Catholic Society of the Christian Brothers was instituted, which continues its great educational efforts. In 1811 also was founded the Kildare Place Society, which attempted to provide schools upon a compromise between the Catholic and Protestant religions. Both societies received grants from the Treasury in aid of E. until 1833,

when a national system of elementary schools was estab. under a board of commissioners, among whose powers were those of aiding in the erection of schools, appointing inspectors, and awarding grants to teachers, of providing a training college, and of issuing text-books. In 1861 special provision was made that the membership of the board should be equally divided amongst Catholics and Protestants. The schools are now almost entirely denominational, either Catholic or Protestant. In Eire primary E. is directed by the state. Secondary E. is in private hands, and is for the most part conducted by Religious Orders. School attendance is compulsory for children from 6 to 14 years. State grants to Irish Univ. institutions were transferred from the Treasury to the Irish state govts. (Free State and N. Irish) as from April, 1922. In N. Ireland there are some 900 public elementary schools, and about seventy-two preparatory, intermediate, and secondary schools recognised by the Ministry of E.

SCOTLAND.—E. has always received marked attention in Scotland. Even as early as 1494 freeholders were required by a statute of King James IV. to send their heirs to school to acquire 'perfect Latin.' In 1560 the Church Assembly decreed, under the influence of John Knox, that every church in 'any town of repute' should have attached to it a Lat. school, and in every par. of country diots. there should be a teacher of 'first rudiments.' In large tns., moreover, there was to be a college for 'logic, rhetoric, and the tongues.' In 1696 par. schools in connection with the Estab. Church of Scotland were set up by parl. statute, and a tax was levied upon landowners for their support. The burgh schools or academies were also estab. in most tns., and came under the control of the municipal authorities. In 1839 the system of inspection and annual grants to schools was estab. in England and applied to Scotland. Until 1872 educational legislation extended to both countries alike, though slight modifications and allowances were made in the actual working of the schemes in Scotland. In 1872 the Scottish Education Act made the provision of school boards universal and the property and control of the existing schools, burgh and parish, were transferred to them. Compulsory attendance for all children from 5 to 13 was enforced. The age raised to 11. The Act also distinguished three types of school, the elementary school, the higher grade school, and the higher class school, all of which had primary depts. Powers were also given to school boards to provide meals and medical attendance, defray cost of conveyance in outlying parts, etc., and the Act enabled them to make bye-laws requiring attendance at continuation classes up to 17 years of age. In 1885 the Scottish and Eng. E. Depts. were separated, and the former has since had its own committee and secretary. In 1888 a state system of leaving certificate was introduced into the higher class schools,

and was soon extended to all schools doing higher work. There is also a qualifying examination for transition from primary grade to the intermediate course provided by the higher grade and higher class schools, and the supplementary course provided by the elementary school, and an intermediate certificate for transition from the intermediate to the post-intermediate course of the higher class school. In Oct. 1944 the Sec. for Scotland introduced the Education (Scotland) Bill which was to apply to Scotland (with the necessary modifications) the national policy for

tillan's *Institute*; Elyot's *Governour*; The Jesuits, *Ratio Studiorum*; R. Ascham, *The Scholemaster*, 1563-8; J. J. Rousseau, *Emile, or Education*, 1762; H. Spencer, *Education*, 1861; J. Locke, *Some Thoughts concerning Education*, 1693; F. Froebel, *The Education of Man*, 1891; J. Herbart, *The Application of Psychology to the Science of Education* (trans.) 1898. HISTORY AND GENERAL THEORY: J. Adams, *The Evolution of Educational Theory*, 1912; N. MacMunn, *The Child's Path to Freedom*, 1921; B. Russell, *On Education*, 1926; A. N.



B.B.C

BROADCASTS FOR SCHOOLS: A RADIO MUSIC LESSON

The boys co-operate with the broadcaster, tapping out the beats with pencils at his instruction

E. provided by the Education Act for England and Wales. See also ADULT EDUCATION; FOLK HIGH SCHOOLS; TECHNICAL EDUCATION; etc.

BROADCASTING TO SCHOOLS.—Among the specialised programme services provided by broadcasting, the most important are perhaps the broadcasts to schools. In Great Britain the value of educational broadcasting was established as early as 1927, when a year's experiment was conducted among the schools in Kent. Twenty years later over 12,000 schools were registered as listening regularly to the Brit. Broadcasting Company's schools broadcasts. In the U.S.A. education by radio has also achieved a prominent position, educational broadcasts being provided by the Amer. companies for nearly 100,000 schools. In 1949 the Brit. Broadcasting Corporation conducted experiments in teaching by television.

Bibliography.—THE CLASSICAL TREATISES: Plato's *Republic and Laws*; Quint-

Whitehead, *The Aims of Education, and Other Essays*, 1929; J. J. Flinck, *The Foundations of Education*, 1928-30; C. Norwood, *The English Tradition of Education*, 1930; J. Dewey, *The School and Society*, 1932; A. Adler, *Social Interest: A Challenge to Mankind*, 1938; T. P. Nunn, *Education: Its Data and First Principles*, 1945; J. F. Wolfenden, *The Public Schools Today*, 1949. SIGNIFICANT EDUCATIONAL EXPERIMENTS: R. Steiner, *A Practical Course for Teachers*, 1919; *The Education of Children in the Light of Anthroposophy*; Helen Parkhurst, *Education on the Dalton Plan*, 1922; A. S. Neill, *The Problem Child*, 1926; L. B. Pekin, *Progressive Schools*, 1934; Maria Montessori, *The Secret of Childhood*, 1936; J. H. Simpson, *Saner Schooling: A Record and a Criticism of School Life*, 1936; J. H. Bradley, *A Schoolmaster's Testament: 40 years of Educational Experience*, 1937; F. O. Hapgood, *Citizens in the Making*, 1937; H. Read, *Education*

through Art, 1943; C. Stimson, *Education After School*, 1948. *For Nursery Schools*: Margaret MacMillan, *The Nursery School*, 1930; Margaret Lowenfeld, *Play in Childhood*, 1935; S. Isaac, *The Intellectual Growth of Young Children*, 1938; D. E. Garner, *Education under Eight*, 1948. *UNIVERSITIES*: J. H. Newman, *Idea of a University*, 1873; F. R. Leavis, *Education and the Universities*, 1943; B. Truscot, *Redbrick University*, 1943.

Education, Agricultural. See AGRICULTURE.—*Organisation of Agricultural Education in Britain*; AGRICULTURAL RESEARCH.

Education, Ministry of. State dept. in the United Kingdom, known until 1944 as the Board of Education. This Board had its origin in the appointment in 1886 of a minister responsible to parliament. This office was originally held, according to the provisions of the Bill passed in the above-mentioned year, by the vice-president of the Committee of Council on E., and at the same time as a minister was made responsible the dept. of science and art was taken from the hands of the Board of Trade and given to the control of the committee. The Board of Education Act of 1899 abolished this office of vice-president of the council and created a president of the Board of Education, which was the dept. of education and of science and art united in one committee. In addition to the president there was also a parl. secretary appointed. The Board underwent a further change in 1902, when it was divided into three definite divisions, to control respectively, primary, secondary, and technical education. The M. of E. was estab. by the Education Act of 1944. The minister is of cabinet rank, and has a salary of £5000.

Education, Technical. See TECHNICAL EDUCATION; EDUCATION.—*The Spens Report*.

Education, University. See UNIVERSITIES.

Edward the Confessor (1004–10 to 1066), apparently the second son of Æthelred the Unready and his wife Emma of Normandy. His surname was given on account of his reputation for superior sanctity. The greater part of his early life was spent in exile, since on the death of his father the throne of England passed into the hands of a Dan. dynasty. His mother married Canute (Cnut) after the death of Æthelred the Unready, and by him had two sons, Harold and Hardicanut. In 1041 Hardicanut invited Edward from the Norman to the Eng. court, an invitation which carried with it recognition of his claim to the Eng. throne. In 1042 Hardicanut died, and E., not without some opposition, was elected king of England. His reign was one long story of England struggling against the influence of Normandy. His long exile in Normandy had made him more Norman than Saxon, and the atmosphere of his court was almost entirely Norman. The most prominent Eng. family, the Godwins, struggled against this, but recognition of the Saxon point of view meant recognition of the unspoken claim of Harold, Godwin's son, to the throne of England. E.'s reign is chiefly noted for the rule of the Godwins

and the visit of William the Bastard of Normandy, to whom E. is alleged to have promised the crown. He died Jan. 6, 1066, after practically nominating Harold to the Eng. throne. He was canonised, with the title of Confessor, in 1161 by Pope Alexander III. Had he lived within the shadow of the cloisters his life might easily have been of value and service, but as a king he was feeble, and, having no administrative ability, the real gov. of the kingdom during his reign was placed almost entirely in the hands of favourites.

Edward I., the Elder (d. 924), king of the W. Saxons. E. was the second son of Alfred the Great; he succeeded his father in 899. After a succession of battles with the Danes, E. was chosen as 'father and lord' by the Scottish, Northumbrian, and Welsh kings.

Edward II., the Martyr (926–978), king of the Eng., whose short reign was mostly marked by the anti-monastic reaction. His assassination at Corfe Castle in Dorset was probably arranged by his step-mother, Ælthyth, who was anxious to place her own son, Æthelred, upon the throne. Shortly after his death he was popularly esteemed to be both a saint and a martyr.

Edward I., king of England, and eldest son of Henry III., was b. in June 1239 at Westminster. He was married in 1254 to Eleanor of Castile, and on the occasion of his marriage was invested with the baronies of Gascony and Wales. It was in Gascony that he first received that training as a warrior which was to stand him in such good stead later on. During the baronial troubles of his father's reign, his attitude may best be defined as defending the royal claims and prerogatives, whilst at the same time realising the justice of the claims of Simon de Montfort, and later incorporating them with his own views. He was at an early age distinguished as a warrior and a general, and took a prominent part in the Baronial Wars. He was responsible for the overthrow of the Royalist forces at Lewes, since by the wild charge which swept his sworn enemies, the Londoners, from the field, he so weakened the Royalist force that on his return from the pursuit he found his father's forces had been defeated, and surrendered. He made his escape from prison in 1265, and defeated Simon de Montfort at the battle of Evesham (1265). After the Dictum of Kenilworth had virtually ended the civil strife, it may be said that E.'s reign begins, since he was influential enough to prohibit the misrule of the earlier days of his father's reign. In 1270 he set out on a crusade, and returning to Europe in 1273, after a narrow escape from death at the hands of an assassin, he learnt of his father's death. The principle of primogeniture was estab. by his recognition as king of England during his absence. He was crowned in Aug. 1274 having spent the two intervening years in settling affairs in Italy, France and Gascony. E. was regarded by his subjects as their first truly Eng. king, and certainly his policy was thoroughly Eng. even though his speech and ideals

were not. He was a handsome man of great stature, on which account he was nicknamed 'Longshanks.' His reign is important from every point of view. He instituted, or caused to be instituted, numerous legal and social reforms. He adopted an ideal and essentially insular home policy. He carried out to the best of his ability a foreign policy which redounded to the honour and glory of England. His first trouble at home came from Wales, and he was able to commence his policy of creating a 'united Britain' by annexing Wales after the second Welsh war, which ended in the overthrow and death of the last Llewellyn (1282). The Statute of Rhuddlan made Wales an Eng. possession. Between 1284 and 1290 the time was occupied with the initiation of new legislation. E. was determined to be king not only in name but in reality, and his legislation tended towards that end, incorporating perhaps also to a certain extent the ideal of 'what touches all should be approved of all.' His chief measures in this direction were: The abolition of the office of Justiciar, leading to the organisation of the three common law courts, the Assize of Winchester (a nation in arms at the disposal of the king), the Statute of Mortmain, and *Quia Emptores* (a means of preventing subinfeudation). It is perhaps merely coincidence that all the great legislative reforms should cease with the death of Badnell, the chancellor, and that by far the most stormy period of E.'s reign should follow that death. The next great trouble of the reign was the interference of E. in Scottish affairs. In 1286 Alexander III. had died, leaving as his heir the Maid of Norway, his grand-daughter, who was only six years of age. In pursuance of his ideal of a united Britain, E. planned a marriage between the Maid and his son, Edward of Carnarvon. The marriage was accepted in Scotland, but in 1290 the Maid died, and the affairs of Scotland became chaotic. E. as arbitrator at Nottingham chose John Balliol as king of Scotland, out of a dozen claimants, the most prominent of whom was Robert Bruce. Balliol did homage to E. as his over-lord, but the Scottish people, resenting keenly the attitude of E., forced Balliol into open rebellion, and E. invaded Scotland. By the end of 1296 he had reduced Scotland, and at Brechin had forced Balliol to surrender the crown. He appointed his own regents for Scotland and departed southward, taking with him the famous Stone of Destiny. In 1297 Scotland, led by the hero Wallace, was again in rebellion. N. England was harried, and at Stirling Surrey and Cressingham were totally defeated. E. hurried back, and in 1298 overthrew Wallace at Falkirk. The struggle still continued, but E. may be said to have been master of Scotland between 1298 and 1306. In the meantime affairs at home and abroad had not been going well. In 1295 was called the Model Parliament. In 1297 and 1298 came his troubles with the clergy under Winchelsea, and the barons under Boyd and Bohun. The taxation of the period was excessive, and strong though E. was,

the barons and the people wrung from him the *Confirmatio Cartarum* and the *De Tallagio non Concedendo*. In 1299 he had married the sister of the King of France. In 1305 Wallace was captured and executed, and in the following year Bruce murdered Conyn, and seized the crown of Scotland. E. hurried northward, but he was falling fast in health, and in July 1307 he died at Burgh-on-Sands. He ordered his body to be borne before the army until Scotland was conquered, but his graceless son sent it down to Westminster for burial. On his tomb is inscribed *Edwardus Primus Malleus Sclotorum hic est*. He may best be described as a man of stern character, jealous of his honour and of the honour of his country, true to his word when it suited his end, and only then. When it was necessary, E. did not hesitate to break his pledged oath, and his motto, *Faciam serua*, may be almost regarded as a fine ideal which the spirit of the age made it impossible for him to attain. See lives by R. B. Seeley, 1860, and E. Jenks, 1902.

Edward II., king of England, was b. in April 1284, and was the first of the Eng. crown princes to bear the title of Prince of Wales. He succeeded his father in July 1307, and disobeyed his last command to continue the war with Scotland. Weak and incapable, his reign is one long record of his struggle with the barons. His favouritism of Piers Gaveston was most unpopular, and the honours showered upon the favourite cost Gaveston his life. The barons, forming a committee, drew up the Ordinances which E. was forced to accept (1318). Two important constitutional points were settled in this reign: (1) That grants of aid should be preceded by redress of grievances; (2) that the consent of parliament consisted not only of the consent of the barons but of the people as well. In 1326 Isabella, the queen, who had been in France with her son (Edward), returned, landed at Orwell, and marched against the king. The Despencers, favourites for the moment, were captured and executed, and the king was deposed. In 1327 he was brutally murdered in Berkeley Castle. Outside England, E. had shown his weakness in the total defeat of the Eng. army at Bannockburn in 1314, a victory which was followed up by the capture of Berwick, and resulted in the practical independence of Scotland. See T. F. Tout, *The Place of the Reign of Edward II. in English History*, 1911.

Edward III., son of Edward II., b. in 1312 and crowned in 1327. In 1328 he married Philippa of Hainault. During the early years of his reign Isabella and Mortimer retained the real power, until in 1330 he banished his mother and executed Mortimer. He then made peace with France in order to turn his attention to Scotland, where in the early years of his reign (1330-36) he fought three campaigns, in which he defeated the Scots (notably at Halidon Hill on July 19, 1333) and forced Edward Balliol to do homage to him. After each campaign, however, the Scots rallied, and E.'s attacks on Scotland were

stopped by the outbreak of war with France. His formal claim to the throne of France in right of his mother was correctly regarded as a pretext. The war was essentially a commercial war, and was fought by Edward because he desired to retain the Flemish woollen trade, and also because he was deeply imbued with the ideals of chivalry and regarded himself as a warrior king. He also probably adopted the style of king of France in order to obtain the allegiance of the Flemings. The war opened with the battle of Sluys (1340), a naval victory for England. The next few years were not so successful, but in 1346 was fought the battle of Crécy, which resulted in the overthrow of the Fr. army, the vindication of the tactics of the Eng., and the downfall of feudalism on the Continent. In the following year Calais fell into the hands of the Eng., and in the previous year the battle of Neville's Cross had delivered David, King of Scotland, a prisoner to the Eng. queen. The Black Death in England in 1349 put an end to the war for some time, and resulted also in the changing of the labour market in England. The relationship between the lords of the manor and the inhabitants changed, and although the Statute of Labourers purported to fix wages, its provisions were found to be unworkable. In 1355 war was renewed, and Edward the Black Prince won a great victory at Poitiers. The Fr. king, John, became prisoner and was taken to England. In 1360 the treaty of Bretigny was signed, and E. gave up his pretensions to the Fr. throne and received Aquitaine and Ponthieu as a sovereign prince. The Scottish king had been released in 1357 on the payment of ransom, and the Fr. king in 1360. The latter, however, finding it impossible to raise the ransom, returned to England, and died there a prisoner in 1364. War again broke out in 1369, and dragged on not very successfully until 1377. In that year Edward the Black Prince died early in June, to be followed by his father towards the end of the month. The latter years of his reign had been years of decadence. E. had fallen under the influence of Alice Perrers, his mistress, and the power had passed largely into the hands of John, duke of Gloucester. But the reign had been distinguished for the setting up of a sound commerce and for the beginning of the revolt against the Rom. Church. The Statute of *Præmunire* showed the setting of the current towards separation from the Rom. Church. E.'s reign is very important in the hist. of constitutional progress. Although the enthusiasm aroused by the Fr. war sometimes enabled the king to levy illegal taxes, Parliament succeeded in placing important restrictions on the royal power, as e.g. when the king declared in 1352 that the levy of tallage should cease and again when the prerogative of purveyance (see under *PRE-EMPTION*) was abolished in 1362 except for the personal needs of the king and queen. Parliament also asserted its complete control over customs, such as tunnage and poundage, by the Statutes of 1362 and 1371 which enacted that neither merchants nor

any other body should impose a subsidy or charge on wool without parl. consent. Again the right of the Commons to deliberate on questions of peace and war was clearly established in this reign. In judicial matters, two important privileges were won: the Commons asserted their right to impeach the ministers of the Crown (1376) and the Lords confirmed their claim to trial by their peers alone. See lives by W. Longman, 1869; W. Warburton, 1875; and J. Mackinnon, 1900.

Edward IV. (1442-83), son of Richard, duke of York, and Cicely Neville, b. at Rouen on April 28. He bore in his youth the title of Earl of March, and spent the greater part of his early life on the Marches. He took part in the first unsuccessful struggles of the Yorkists, and retired to Calais, whence he returned with the other Yorkists in 1459. He was on the Marches of Wales when he heard of the overthrow of his father at Wakefield. He marched towards London, winning on the way the battle of Mortimer's Cross, where he routed Gaspar Tudor, and then, by threatening London, prevented the victorious Lancastrians from entering, and himself entered it in March 1461. He was proclaimed king, and immediately marched N. again where in March he established his position by the great victory of Tewton. He owed his position more to his relatives the Nevilles and especially to Warwick, the king-maker, and at first showed his gratitude by practically allowing Warwick to rule the country. He showed, however, that he was essentially ungrateful by twice flouting Warwick's policy of foreign marriages. Especially was this seen when he disclosed his marriage to Elizabeth Woodville when Warwick had advocated and practically arranged a marriage with a Fr. princess. Still matters did not come to a head until Warwick, acting in conjunction with Clarence imprisoned E. in his castle at Middleham. He escaped, and Warwick retired to France, only to appear in the next year with an army which forced E. into exile in Burgundy. After some little difficulty he received assistance from Charles of Burgundy and returned, defeating Warwick at Barnet and Margaret of Anjou at Tewkesbury (1471). He was still troubled by the intrigues of Clarence, who was murdered in 1478. E. died on April 9, and was buried at Windsor. In character he was reckless and dissolute, yet not devoid of ability. After the Lancastrian struggles he was strengthened by the wealth which he obtained by confiscation and by his recognition of the fact that England needed a breathing space after her century of war. He is sometimes regarded as a precursor of the Tudor autocrats. He was a typical product of the Renaissance period; tyrannic in rule, but a patron of learning and of the new discoveries. He was a patron of Caxton. See *Historie of the Arrivall of E. IV. in England, and the final recoverye of his kingdomes from Henry VI.*, 1471, ed. J. Bruce (Camden Society), 1838; C. L. Scofield, 1923.

Edward V. (1470-83), elder son of Edward IV. His uncle, Richard, Duke

of Gloucester, was appointed regent for him. With feigned reluctance Richard accepted the crown of England for himself. The king and his brother were at this time living in the Tower, and when an attempt was made to release them the news spread that they were dead. The manner of their death only became known some twenty years later, when it was established, practically beyond doubt that they had been smothered in the Tower by order of their uncle, Richard III. See lives by Sir T. More, 1641; Sir C. R. Markham in *The English Historical Review* (vol. vi), 1891.

Edward VI. (1537-53), only son of Henry VIII., and the only child of Henry by his third wife, Jane Seymour, who d.



EDWARD VI.
After Holbein

twelve days after his birth. He was given a sound and careful education, but from his birth it was recognised that he would probably not live long. He was never created Prince of Wales, but bore the title Duke of Cornwall from his birth. He succeeded his father when not quite ten years of age, and as was natural, the power of gov. was exercised by regents, first, the duke of Somerset, and second by the duke of Northumberland. He was practically a nonentity during his short reign, the famous Acts assigned to him being the work of the regents. He was brought up in the Protestant faith, and gave promise of becoming a fanatic. He left a will when he died which was obviously the work of Northumberland. By it he set aside the will of his father and left the throne to Lady Jane Grey and her heirs male. Lady Jane Grey had but recently been married to the eldest son of Northumberland. Edward died in July and was buried in Henry VIII. Chapel. See life by Sir C. R. Markham, 1907, and J. C. Nichols (ed.), *The Literary Remains of King Edward VI.* (Including diary, 1549-52), 1857.

Edward VII. (1841-1910), Albert Edward, King of Great Britain and Ireland and of the Brit. dominions beyond the seas,

Emperor of India, was the eldest son and second child of Queen Victoria and Prince Albert, and was born at Buckingham Palace on Nov. 9. In the Dec. following he was created earl of Chester and Prince of Wales. He was educated under private tutors, and in 1859 went to the Univ. of Edinburgh. From here he went first to Christ Church, Oxford, and later he was attached to Trinity College, Cambridge; resided at Madingley Hall, 4 m. out, rooms being allotted to him for occasional use at Trinity Lodge by Dr. Whewell the Master. In 1858 he had been made a Knight of the Garter, and a colonel in the army. In the following year, travelling under his first formal incognito, he visited Italy and Spain, and in the following year travelled through Canada and the U.S.A. He had already impressed the people whom he had met with his good-fellowship and charm, but his early life was passed under many restrictions, which did not lessen in severity after the death of his father the Prince Consort. He returned from America, having left there a very favourable impression, to continue his univ. course, after which in 1861 he went to Ireland to the Curragh, where he joined his regiment the 10th Hussars. In the Sept. of the same year he met for the first time the Princess Alexandra of Denmark who was ultimately to become his wife. The year 1861, however, was a sad one for the prince. Early in the year his maternal grandmother died, and on Dec. 13, the prince, hastily summoned from Cambridge, was present at the death of his father. In 1862 he went, under the guidance of Dean Stanley, for a tour through the Holy Land, and early in 1863 was admitted a member of the Privy Council and took his seat in the Lords as duke of Cornwall. On March 10, in the same year, he married the Princess Alexandra. He was granted an income of £40,000 a year in addition to the revenue of the Duchy of Cornwall, and Sandringham was purchased for him, whilst Marlborough House became his tin. residence. His eldest son, Prince Albert Victor (Duke of Clarence), was born 1864, Prince George Frederick Ernest Albert (George V.) 1865, Princess Victoria Louise, 1867, Princess Victoria, 1868, Princess Maud (Queen of Norway), 1869.

After his marriage the Prince of Wales played an important part in the social life of the nation. The death of the Prince Consort had been an overwhelming blow to the queen, and for many years following it she lived in practical retirement. The prince, however, fulfilled his duties admirably; he was always ready to help forward charitable movements, and he played an important part in the linking together of the empire by his various foreign tours and visits. He had already visited France, and had formed a lasting friendship for that country, a friendship which did not waver in spite of many political incidents. Amongst his more important visits may be mentioned, Egypt, 1869; Ireland, 1871; Russia, 1874; India, 1875; Ireland, 1885. In

1871 he was struck down with typhoid fever, and for a time his life was despaired of, but gradually he recovered, and in Feb. 1872 a public thanksgiving was held at St. Paul's. In 1892 his eldest son, Prince Albert Victor, on the eve of his marriage to the Princess May Victoria of Teck, died after a very brief illness. In the following year the marriage of his son, Prince George, took place, his bride being the Princess May Victoria of Teck. In 1894 a son, Prince Edward of Wales, was born to the duke of York. In 1897 the Prince of Wales took a leading part in the arrangements and the actual events of the queen's Diamond Jubilee. In the following year whilst paying a private visit to Baron Ferdinand de Rothschild he broke his knee cap, an accident from which, however, he entirely recovered. Whilst passing through Brussels in the next year he was fired at by a youth named Sipido, but fortunately no injury was done.

Early in 1901, his mother, Queen Victoria, died, and the prince succeeded with the title of Edward VII. In May 1902 the war in S. Africa was brought to an end. The personal popularity of the king was seen from the very beginning of his reign. He took an active part in the political and social life of his people; but he refrained always from showing any marked political bias. He was continually visiting in various parts of the country, and he undoubtedly kept well in touch with the opinions of his people. He was thoroughly constitutional, and though much has been written to the contrary, his outlook on foreign policy was evidently capable and statesmanlike. In spite of his continual visits to various parts of the country, he always spent at least three months of every year abroad, where he was always extremely popular. The early part of his reign was clouded by his illness just before his coronation, but he recovered and was crowned on Aug. 19, 1902. In 1905 the Conservative gov. resigned and was succeeded by a Liberal one. The year 1909 was one of grave political crisis, the budget of Lloyd George, Chancellor of the Exchequer, created unprecedented excitement in the country and was rejected by the House of Lords. The gov. resigned, but the Liberals were again returned to power, this time with the abolition of the veto of the House of Lords as the foremost plank of their platform. The speech from the throne containing the words, 'in the opinion of my ministers,' was the formal speech of the prime minister, and had not been altered in any way by the king. The king supported his ministers in their demands, as by the constitution he was bound to. Early in 1910 the king was taken ill, but recovered, but again on May 5 he was reported to be suffering from bronchitis, and on the following day he died of heart failure. In spite of his lack of political training, and on that point there is no contradiction, E. won for himself speedily the affections of his people. Whether he was great as a foreign statesman, or whether his policy was but the policy of his ministers, by his subjects he

was unanimously hailed as Edward the Peacemaker. See *Lives* by Sir E. Dacey, 1910, and Sir Sidney Lee, 1925-27.

Edward VIII. (Edward Albert Christian George Andrew Patrick David), king of Great Britain, Ireland etc., from Jan. 20 to Dec. 10, 1936; eldest son of the duke and duchess of York (afterwards George V. and Queen Mary) b. June 23, 1894, at White Lodge, Sheen. He was created Prince of Wales on his sixteenth birthday and, before attaining his majority, in 1912, he had completed his naval education at Osborne and Dartmouth, being gazetted midshipman in 1911 on the *Hindustan*, where he earned a reputation for hard work. He went into residence as a commoner at Magdalen, Oxford, in Oct. 1912. Was promoted to Lieutenant in March 1913. Was attached to the staff of Sir John French (later Earl Ypres) on the Western Front in 1914. Appointed staff captain with the Mediterranean Expeditionary Force in 1916, and became D.A.Q.M.G. in the same year. In 1917 he paid a visit to the I. front. Became colonel-in-chief of the Cadet Corps in 1918, his challenge shield being a much coveted trophy among cadet boxing teams. In 1917 was appointed colonel-in-chief of the 12th Lancers and of the Royal Scots Fusiliers. Made a freeman of the City of London and high steward of Plymouth in 1919. Visited Canada, where he had a ranch at Calgary, and also the U.S.A. in Aug. 1919, being enthusiastically welcomed in both countries. Visited Australia, 1920, India, 1921, Africa, 1925, and Canada again in 1923 and South America in 1925 and 1931. On his second Canadian visit was made a Privy Councillor for that Dominion. Made president of the Brit. Association at Oxford in 1926. Assumed the title of Master of the Merchant Navy and Fishing Fleets, 1928. He also held the titles of earl of Chester (1910-36), duke of Cornwall, earl of Carrick, baron of Renfrew, Lord of the Isles, and Grand Steward or Seneschal of Scotland, Knight of the Garter, 1911, of the Thistle, 1922, and of St. Patrick, 1927. He succeeded to the throne on his father's death, but abdicated uncrowned, because of manifestations of widespread distaste in regard to his proposed marriage to Mrs. Wallis Warfield (formerly Mrs. Ernest Simpson and now duchess of Windsor), an American citizen. He left England immediately afterwards and married her at the Château of Condé, France, on June 3, 1937. After his abdication he was created duke of Windsor.

Edward, the Black Prince, see BLACK PRINCE.

Edwardesabad, tn. of N.W. Frontier Prov., Pakistan, India, now called Bannu and Dhulipnagar. It lies in the valley of the Kuram R., and was noted as the base for all punitive expeditions to the Tschil Valley and Waziri frontier. Pop. 23,000.

Edward Medal, an award for acts of heroism performed by miners and quarrymen or to those who rescue them when in

danger; estab. in 1907 by King Edward VII.

Edward, Lake, formerly **Albert Edward Nyanza**, lake of Central Africa, and one of the Nile's W. reservoirs. It was discovered by Stanley in 1889, when he succeeded in tracing the Semliki—the one and only outlet of the lake—to its source, and by him named Albert Edward after the Prince of Wales, who became Edward VII. It was agreed by the Anglo-Ger. Boundary Commission of 1902-4 that it lay within the sphere of influence of the Congo Free State. The lake forms part of the W. boundary of Uganda Protectorate. The total length of L. E., which is oval in form and scarcely at all indented, is 44 m., the breadth never exceeding 32 m. Lake Dweru, which is connected by a narrow stream with the N.E. extremity of L. E., was discovered by Stanley as early as 1875. This smaller sheet of water is formed chiefly by the Mpango, which flows from the E. ridges of the Ruwenzori range, whose S. slopes form in the distance a splendid background to the N. fringes of the larger lake. E. L., which is fed by the Ruchuru—a headstream of the Nile—is wreathed during the dry seasons by dense mists. But when the rains come, these roll away, disclosing to view the splendid amphitheatre of hills to W. and N. Vegetation is scarce. See S. Baker, *Albert Nyanza*, 1906.

Edwards, Amelia Ann Blandford (1831-1892), Eng. novelist and Egyptologist, was a Londoner by birth. She pub. over fifteen novels, the best of which are usually admitted to be *My Brother's Wife* (1850), *Debenham's Pow* (1870), and *Lord Brackenbury* (1880). Her lectures on Egypt appeared in print under the title of *Pharaohs, Fellahs, and Explorers* (1891), but her most universally appreciated book was one of travel entitled *A Thousand Miles up the Nile* (1877). In 1882 she founded, and was long an honorary secretary of, the Egyptian Exploration Fund.

Edwards, Henri Milne, see MILNE-EDWARDS, HENRI.

Edwards, John Passmore (1823-1911), newspaper proprietor, a man of humble origin, became a journalist and a lecturer on temperance and the corn laws. Coming to London in 1845, he was one of the promoters of the Early Closing Association, and was active in his advocacy of a peace society. Five years later he began to found newspapers, but it was not until 1862, when he purchased the *Building News*, that he began to prosper in his affairs. In 1876 he acquired the *Echo*, the first halfpenny newspaper, which, though it had been eight years in existence, was not prospering. The *Echo* and the *Weekly Times* were the foundation of the great fortune he made. The bulk of this fortune was distributed in his lifetime in gifts of free libraries and institutions in various parts of England. In his lifetime he was much honoured as a philanthropist, and he was offered a knighthood by Queen Victoria and again by Edward VII., but on both occasions he declined the distinction. In 1905 he printed privately an autobiography, entitled *A Few Footprints*.

Edwards, Jonathan (1703-58), Amer. divine, b. at S. Windsor, Connecticut, was the son of a clergyman, and was himself ordained in 1727. For nearly twenty-four years (1727-50) he was associated as minister with Northampton, Massachusetts. Here he successfully piloted his people through the great wave of Revivalism, which swept his parish among so many others after the preaching of George Whitefield. But his vigorous crusade against the circulation of immoral literature and, above all, his insistence on admitting none but true converts to the Holy Communion, forced him to give up his pastorate. His *Enquiry into the Freedom of the Will* (1754), has estab. him as one of America's foremost metaphysicians, whilst his spiritual nobility shines out in his book, *True Nature of Christian Virtue*, in spite of the cloud of a somewhat austere Calvinism. He has been called the 'Spinoza of Calvinism.' See life by A. V. G. Allen, 1889; F. H. Foster, *Genetic History of the New England Theology*, 1907; V. L. Parrington, *Main Currents of American Thought*, vol. 1, 1927.

Edwards, Richard (c. 1523-66), Eng. musician and playwright. He was appointed a gentleman of the Chapel Royal, and master of the children. In the Christmas of 1564 he produced a play which was acted by his choir boys, and later his *Palamon and Arcite* was played before Queen Elizabeth. In his day E. was highly esteemed. He is supposed to have written his poem, *The Soul's Knell*, when he was dying.

Edwardsville: (1) tn. in Luzerne co., Pennsylvania, U.S.A., on the Susquehanna R. Its chief industries are mining and brewing. Pop. 7900, of whom nearly half are of Welsh extraction. (2) City in Illinois, U.S.A., 18 m. N.E. of Saint Louis, with coal mines and manufs., and nearby the co-operative vil. of Coclair. Pop. 8000.

Edwin, Edwin, or Edwine (585-633), king of Northumbria, and the son of Ella of Deira. E. was favourably disposed towards Christianity. On the day of the birth of his daughter, his life was attempted by his enemy Cwichelm, king of Wessex. E. vowed that, should he conquer his enemy, he would abstain from worshipping the gods of his race. He was killed by Cadwallon of Wales at Hatfield.

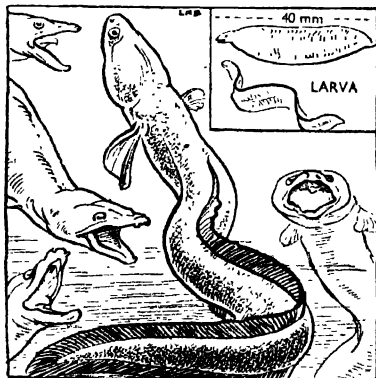
Eeckhout, Gerbrand van Den (1621-74), Dutch painter, b. at Amsterdam; he was a pupil of Rembrandt. His chief subjects are biblical, and of these his small pictures are the best. Some of his pictures are: 'Tobit,' in the Brunswick Gallery; 'The Woman taken in Adultery,' at Amsterdam; 'Simeon in the Temple,' at Dresden; 'Christ among the Doctors,' at Munich.

Eeckhout, Jacob Joseph (1793-1861), painter of historical pictures and portraits, b. at Antwerp. He imitated Rembrandt and is considered one of the most famous painters of the Dutch school. His best works are: 'The Death of William the Silent,' 'Peter the Great at Zaandam,' 'The Departure of the Recruits of Scherpeningen,' 'Collection de

Portraits d'Artistes modernes, nés dans le Royaume des Pays-Bas, 1822.

Ecclou, tn. in Belgium, 11 m. N. of Ghent. The chief manufs. are cotton, linen, and wool. Pop. 14,000.

Eeden, Frederik Willem van (1860-1932), Dutch poet and novelist, b. at Haarlem. He took his degree in medicine at Amsterdam in 1886 and for a time followed the medical profession. He was, however, in the van of the literary movement in Haarlem in the eighties and relinquishing medicine for literature became the editor and co-founder of the paper *De Nieuwe Gids*, which was the organ of the younger literary group. In this he pub. his first novel *De Kleine Johannes* (1887; Eng. trans. *Little Johannes*, 1895), a religious story in which he expressed his own deep religious mysticism. This led him to start a community centre at Bossum which he named Walden in honour of Thoreau. It was not however a success. Eventually he was converted to Rom. Catholicism. Soon afterwards he wrote the mystical poem, *Ellen* (1889). His greatest poetical work is, however, *De Broeders* ('The Brothers,' 1894), a realistic drama of a feud between two brothers to which is given a deep spiritual significance. He wrote a number of plays for the theatre. His best known novel was pub. in 1900, *Van de Koele Meren des Doods* (Eng. trans. *The Deepes of Deliverance*, 1902). His jours. which illumine his spiritual life have been pub. since his death.



EEL

Eel. The *anguilla*, or fresh-water Es. belong to the family Murenidae, a group of soft-rayed osseous fishes, distinguished by the presence of an opening to the air-bladder, and the absence of the pelvic fins. The name is also applied, popularly and scientifically, to other genera, notably the *Conger*, which is usually larger than the true E., and lives in the sea. In 1904

Dr. Johannes Schmidt estab. that the fresh-water eels of Europe and America migrate to the sea to spawn once in their life, and have a journey of 3000 miles to the breeding grounds which lie between the Leeward Islands and Bermuda. It is characterised by an elongated form of body, by the rudimentary scales buried in the skin and by the rounded fall-fin confluent with the median fins. There are no accessory breathing organs; the stomach has a blind appendage; the vent is generally situated far back, but may be near the pectoral fins; and the ovaries have no ducts. In the skeleton the pectoral arch is unconnected with the skull and attached to one of the earlier vertebrae. The true Es., congers and murenas, or large marine Es., are marked by a normal structure of the upper jaw, which is formed in front by the premaxilla, and laterally by the toothed maxilla. All the family of Murenidae are predatory and voracious, and feed on almost any animal food they can obtain, living or dead, the conger being especially fond of squid, the fresh-water E. devouring carrion of all kinds.

Eel-pout, see BURBOT.

Eesti Vabariik, see ESTONIA.

Effendi, Turkish title of respect corresponding to the Eng. 'sir.' It follows the personal name, and is generally given to physicians or members of the learned professions when they have no higher title.

Effervescence. The extent to which gases are soluble in water depends upon pressure and temp. When the temp. is low and the pressure great, the gas is more soluble, consequently when the temp. is raised or the pressure lowered, the gas escapes in small bubbles. This phenomenon is called E. The term is also applied to the tumultuous upheaval of any liquid by a gas produced in it, giving it the appearance of boiling (Lat., *fervere*, to boil). The similar phenomenon *frothing* is often a nuisance during distillation; it may be partly or wholly prevented by adding bits of broken unglazed earthenware to the liquid undergoing distillation.

Efficiency. In any method of transmitting energy from point to point, or of transforming one kind of energy into another, some of it is dissipated or become useless. The ratio of the energy available at the end of the process of the total energy supplied is called the E. of the process. Thus, in transmitting mechanical energy by means of shafting, some of it is used in overcoming friction of bearings, etc. The numerical value of the Es. of machines varies very widely. In a simple machine, such as a pulley, the E. may be as high as 80 per cent and in a screw jack, as used on motor cars, as low as 36 per cent. It must be remembered, however, that the loss of E. is compensated by the fact that the friction prevents the screw jack running backwards when left free. In transmitting electrical energy, some of it is used in the wires or cables which carry the current. As this loss is proportional to the current, it is advisable to transmit energy at high

voltage when the current will be low. In processes for transforming energy from one kind to another, the Es. show wide variations, and the object of most improvements in 'transformers' or engines is to increase the E. A locomotive engine may transform less than 10 per cent of the heat of the coal burned into available mechanical energy. But in transforming mechanical energy into electrical energy, or *vice versa*, the Es. are usually greater, as much as 92 per cent of the energy supplied being available for use after transformation. The term E. is sometimes used in speaking of electric lamps, where it expresses the candle power per unit of electrical energy supplied.

Efflorescence, in chemistry, is the term applied to the crumbling to powder of crystals, caused by the loss of water originally present in them. It occurs whenever the vapour pressure of the water in the crystal is greater than that of the moisture in the surrounding air. Glauber's salt and ordinary washing-soda are good examples of efflorescent substances. The converse of E. is deliquescence (*q.v.*).

Effusion of Gases, *see* GAS and GASES.

Effusive or Eruptive Rocks, *see under* IGNEOUS ROCKS.

Elreet, *see* AFRIT.

Eft. The terms E. and nowt are applied to almost all species of lizards found in the Brit. Is. *See* NEWT.

Ega de Queiroz, José Maria (1845-1900), Portuguese author, b. either at Villa do Conde or at Provoa do Varzim; son of a retired judge. Educated at the Univ. of Coimbra. Collaborated in *As Farpas* (satirical sketches), 1871. Consul at Havana, Newcastle, Bristol (1876), and Paris (consul-general 1888). Died in Paris. Pubs. include the novels: *O crime do Padre Amaro* (1874, rewritten 1880); *O primo Basilio* (1877), *A Reliquia* (1886), *Os Maias* (1888). His short stories are particularly admired. *The Sweet Miracle* has been trans. into both Eng. and Irish. He is considered the greatest modern Portuguese writer and is certainly the only one whose books have been considered worthy of trans. into many languages. *The Crime of Father Amaro*, his masterpiece, created great interest in its Ger. trans.

Egan, Pierce, the Elder (1772-1849) Eng. author, principally remembered for his *Life in London* (1821), which, illustrated by George and Isaac Cruikshank, presented a general survey of life in the metropolis. This book is further interesting in that it was the first work of fiction to be pub. in monthly parts. Its popularity was so great that in 1828 E. issued a sequel, *Finish to the Adventures of Tom, Jerry, and Logic*. E.'s other works included *Horiana, or Sketches of Ancient and Modern Pugnism* (1818-24); and *The Life of an Actor* (1825). In 1824 he founded *Pierce Egan's Life in London and Sporting Guide*, a weekly newspaper that afterwards merged into *Bell's Life in London*. His son, Pierce Egan, the Younger (1814-80), was the author of many novels, none of which, however, have survived.

Egbert, king of Wessex from 802 to 836,

when he died. He was commonly called Egbert the Great, was the son of Ethelmund, and a direct descendant of Cedric. In his youth he was driven from England and sought refuge at the court of Charles the Great. The first nine years of his reign were a period of peace, but he then attacked Cornwall and Devon, and reduced them to submission in 813. In 823 he defeated Beornwulf, king of Mercia, and soon after Kent and Essex submitted to his rule. Northumbria acknowledged E.'s supremacy in 829, and in 830 Wales was reduced to submission. E. was then made bretwalda, being the eighth Saxon king to receive that dignity. The last years of his reign were marked by invasions of the Danes, but they were defeated at Hengistdune in 835.

Egede, Hans Pövelsen (1686-1758), Dan. Protestant missionary, b. at Harstad in Norway. He studied theology at Copenhagen Univ., and was appointed pastor at Vaagen in 1707. In 1721 he went to Greenland, where he remained for fifteen years, working zealously among the people. On the death of his wife, in 1736, he returned to Copenhagen, but continued his work for the Greenland mission, of which he became bishop in 1740. He wrote a book on the natural hist. of Greenland.

Eger, *see* CHEB.

Eger (Czech Cheb), tn. and also riv. of Czechoslovakia. The tn., situated on the R. Eger, at the base of a spur of the Fichtelgebirge, is close to the Bohemian borders, and was an important fortress until 1809. It is the cap. of the Egerland, Bohemia, inhabited by Gers. It is an important railway centre, with many high-gabled houses. Wallenstein was murdered by an Irishman in the tn.-hall, which is now a museum, on Feb. 25, 1634. Schiller lived in the 'Schiller haus' in 1791. Wallenstein's generals were murdered in the Kaiserburg built by Frederick Barbarossa. The Gothic church of St. Nicholas dates from 1230 to 1270, and two others from the thirteenth century. The manufs. include textiles, bicycles, agric. machines, earthenware, meal, beer, and a substitute for coffee. Pop. 30,000 (mostly Ger.). There is another tn. of the same name in N. Hungary, which manufs. wine and soap, and has a pop. of 30,000. The R. Eger rises in the Fichtelgebirge at a height of more than 2300 ft. Its general direction is E. There are numerous catnacts and an abundance of fish. After flowing 190 m., it joins the Elbe 30 m. N.W. of Prague.

Egerdir: (1) Tn. of Asiatic Turkey, situated on Lake E., in the vilayet of Konieh, or Konia, 84 m. to the W. of that city. The ruins of Antioch, in Pisidia, are in the vicinity. It exports opium, skins, and leather to Singapore. Pop. 25,000. (2) Lake E., lake of Konieh, Asia Minor, situated in lat. 38° N., between the Taurus range and the Sultan Dagh. It is about 30 m. long, and drains S. into the Mediterranean.

Egeria, in Roman legend, was a nymph. She was the wife of Numa, and was worshipped both in Rome and Aricia as the goddess of childbirth. She was connected

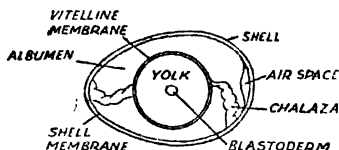
with the Camenae (water nymphs), who were worshipped in Italy before the Muses.

Egerton, Francis, see BRIDGEWATER.

Egerton, Frances Leveson-Gower, see ELLESMERE, EARL OF.

Egesta, see SEQUESTA.

Egg (Old Eng. *æg*; Ger. *Ei*; Swedish *ägg*, probably also Gk. *ová*), the female reproductive cell which develops into a new individual. In all but parthenogenetic animals, this process only takes place after fertilisation by the male gamete. When the word is used in this sense, it is directly parallel to the Lat. word *ovum*, and applies to the intra-maternal as well as the extra-maternal existence of the cell. In common speech the word only applies to the extra-maternal *ovum*. Es. vary very greatly in size. In all cases the essential embryo is very small, but variations occur in the amount of yolk present, and in the thickness and structure of the surrounding parts.



THE EGG OF A HEN

Eggs of birds.—Birds lay on the whole the largest Es. The Es. of the extinct *Archyornis* have a cubic content of over two gallons. The ostrich lays the largest Es. of any extant bird. One weighs about as much as twelve hens' Es. At the other end of the scale is the E. of the humming bird which only weighs a few grains. The shell of a bird's E. is mainly composed of carbonate of lime. It is often coloured, the colouring being specific to the particular variety of bird. Several different pigments have been separated from the colouring of Es. Their origin is still obscure, but they are probably derived from the hæmoglobin in the blood, and may be in some way similar to bile-pigments. The significance of the colour of Es. is difficult to understand. It probably depends upon the environment of the nest. Thus snakes and such birds as deposit their Es. in holes and in domed nests lay white Es. In such cases coloured Es. would be invisible, and they would be in danger of being broken by the mother. Es. which are laid in open nests, or on the bare ground, are coloured to imitate their surroundings. The brilliant Es. are always found in nests with elaborate protective devices, or in ones that are carefully hidden.

Eggs of mammals.—Only two mammals are oviparous: the *Echidna* or spiny anteater, and the *Ornithorhynchus*, or duck-billed platypus. The *Echidna* carries her Es. in a pouch such as the kangaroo has.

Eggs of reptiles.—These are always white or yellowish. They are smaller than birds' Es., but yet possess a good deal

of yolk. The shell is nearly always membranous, but in tortoises, turtles, and crocodiles it is calcareous like a bird's. A few lizards and snakes are viviparous.

Eggs of fishes differ greatly in size and appearance, and some extraordinary varieties are known. Most fishes lay enormous numbers of Es. The sturgeon lays 7,000,000 Es., the turbot over 14,000,000. The number always depends on the risk of destruction, and this rule applies to all animals. For further particulars, see BIRD, POULTRY, REPRODUCTION.

Egg Island, see EGG.

Egg, Johann Maier von, see ECK.

Egger—Moths belong to the *Lasiocampidae*, and *Eriogaster* and are well known in Great Britain. They are of large size, covered with scales, are all of a reddish brown colour, and possess a highly developed hind-wing. The length across the wings may vary, as in the genus *Suana*, from 1½ to 4½ in. The walls of the cocoons have sometimes a smooth, shell-like appearance, hence the name.

Eggishorn, or **Eggeschhorn**, mt. of the Alps in Switzerland, situated in the canton of Valais, near the head of the Rhône valley, and on the S. slope of the Bernese Oberland. It rises to an altitude of 9625 ft.

Eggleston, Edward (1837-1902), b. in Vevay, Indiana. He was pastor of the Church of Christian Endeavour, Brooklyn, from 1874-79. After this date he devoted his time to literature. His works afford a picture of the life, manners, and dialect of the Central West, and his *Hoosier Schoolmaster* was so popular that it was trans. into Fr., Ger., and Dan. Among his works are: *Mr. Blake's Walking-Stick*, for children; *The Graysons*, a novel.

Eggmühl, see ECKMÜLL.

Egham, par. and vill. of Surrey, England, situated on the r. b. of the Thames, 8 m. from Windsor, and 20 m. from London. The par. adjoins Berkshire, and has an acreage of 7786. The Royal Holloway College for women, with 200 students, is here, and was opened by Queen Victoria in 1866. In the neighbourhood is the historic Runnymede. Pop. 14,000.

Egidio Colonna, see COLONNE.

Egin, or **Ekim**, tn. of Asiatic Turkey, in the vilayet of Mamuret-el-Asis, situated on the Euphrates. It is built in a picturesque manner in a kind of elevated basin surrounded by steep rocks. The houses are of stone, and the streets resemble stone ladders. Wine, silk, and fruit are produced and wax, hides, and carpets exported. Pop. 19,000.

Egina, see AGINA.

Eginhard, see EINHARD.

Eglantine, old Eng. name for *Rosa Eglanteria*, the sweet-briar rose. It is misapplied to the honeysuckle by Milton in the lines from *L'Allegro*:

'Through the sweet briar, or the vine,
Or the twisted eglantine.'

Eglinton and Winton, Archibald William Montgomerie, Earl of (1812-61), b. at Palermo. He was descended from the famous family of Montgomerie, which

dates back to about 1150. In 1859 he was made earl of Winton, and was twice lord-lieutenant of Ireland. He took a great interest in racing, and won the St. Leger in 1812, and the Derby in 1849. He is also famous for the tournament which took place at Eglington Castle in 1839, and in which Prince Louis Napoleon took part. This is described by Disraeli in *Endymion*.

Egmont, Lamoral, Count of, Prince of Gavre (1522-68), *b.* in Hainault. He served as a soldier under Charles V. at Algiers in 1541, and in 1546 was made a knight of the Golden Fleece. In 1551 he went as ambas. to England to arrange a marriage between Philip and Mary, which was afterwards solemnised at Winchester in his presence. For his successes at St. Quentin in 1557, and at Gravelines in 1558 (where he was in charge of the cavalry), he was made governor of Flanders and Artois, and in this position he took up the cause of the Netherlands, who were opposed to the Catholic policy of Philip. In consequence of this, in 1568, he was accused of treason and beheaded at Brussels.

Egmont, Mount, extinct volcano of New Zealand, in the S.W. portion of N. Island, in lat. 39° 15' S. and long. 171° 13' E. It is about 18 m. S. of New Plymouth, and is exceedingly beautiful in form. Perpetual snows cover its summit, which reaches a height of 8280 ft., the highest point in the is.

Ego, term used in philosophy, denotes the individual considered abstractly and not in connection with the world and other persons. It is used in two senses which are termed by Kant 'pure' and 'empirical'; the latter term signifies the self in a more concrete sense and includes some part of experience, *i.e.* an object, while the former, the 'pure ego,' is the conscious subject only, and denotes that everything is referred to a self which experiences it.

In the language of psychology the E. is the object-self of the individual consciousness as distinguished from another (the *alter*). The antithesis of E. and alter necessarily restricts the meaning of E. to the object-self inasmuch as it is in relation to the alter, which is the object of thought. The interpretation of the ego-alter relation has been variously attempted. Some psychologists have developed the thought that the E. is a reproduction of traits first discovered in 'alter' personalities. This view is united with the theory of 'ejection' (some one else thought of in terms of the thinker's own consciousness of himself) by J. Mark Baldwin in the 'dialectic of personal growth.' The self-thought tends to a general form which includes two poles, one the E. the other the alter. The elements of content, at first 'projective' in the social environment (*i.e.* cognised as objects but with no antithesis to subject), are taken up by imitation, thus becoming 'subjective,' a part of the ego and being then ejected into the other, constitute the alter. See J. Mark Baldwin (ed.), *Dictionary of Psychology*.

Egotism (Lat. *ego*, I), term used in ethics, generally signifying a system in which the happiness of the individual is

the main object in view. Another form of the word, 'egotism,' in direct contrast to 'altruism,' means selfishness. The ethical doctrines consider that the self consists of an individual and those things in which he is interested, the self being all-important in the application of moral principles, the egoist, seeking the ideal for himself, standing in direct contrast to the altruist, who seeks it for others. But the distinction between altruism and E. is complicated, seeing that the two are often combined, *e.g.* Christian ethics enjoin duty to self and duty to others, while a truly egoistic system can very rarely be carried out. Indeed those who have studied human character assert that men in general are egoistic, seeing that they aim at the gratification of their personal aims and desires.

Egorievsk, see YEGORIEVSK.

Egremont: (1) Tn. of Cumberland, England, situated on the Eden, 6 m. from Whitehaven. E. Castle, built in the twelfth century, is now in ruins. Pop. 6500. (2) Par. and tn. of Cheshire, England, on the Mersey. The tn. is almost opposite Liverpool, and is a steamboat station. Pop. 13,000.

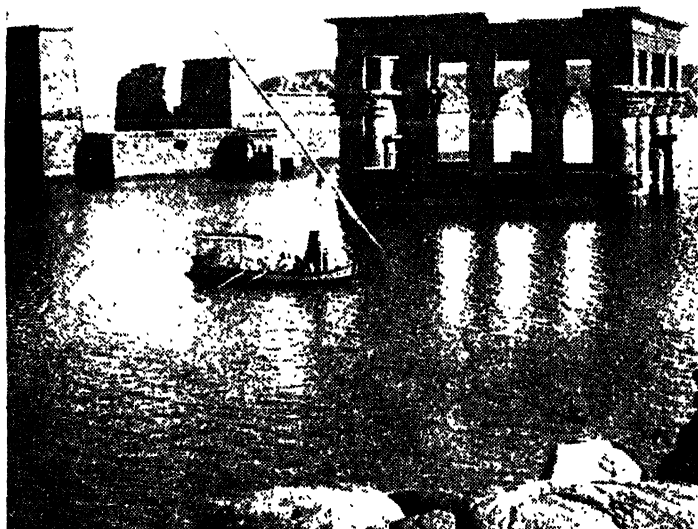
Egret, term applied to sev. species of white herons with long tufts of feathers on the head or neck. The great white E., or the European white heron, is *Herodias* (or *Ardea*) *alba*; and the little E. is *Garzetta* (or *Ardea*) *garzetta*, a native of Europe, Africa, and Asia, which is occasionally to be met with in Britain. See HERON.

Egripos, see EUBCEA.

Egypt, country forming the N.E. shoulder of Africa, bounded on the N. by the Mediterranean, S. by the Anglo-Egyptian Sudan, E. by the Red Sea, and W. by Tripoli and the Sahara. The W. frontier cannot be very clearly defined; the line properly taken is from the gulf of Sollum, skirting the oases of Siwa in the Libyan desert and following S. to Wadi-Halfa, so that the oases of the Libyan desert are included. The N.E. frontier is a direct line from Taba, the head of the gulf of Akaba, following up the boundary of Palestine to the Mediterranean Sea, the peninsula of Sinai being included in E. The area is 100,000 sq. m., a large part of which is desert. The country is divided into Upper and Lower E.; Upper E., or *Es-Said*, the happy or fortunate, being the Nile valley, and Lower E., or *Er-Rif*, the fertile, being the delta. The chief features of E. are the R. Nile and the desert. Without the Nile, E. would never have existed. The riv., with its rich deposit of alluvial soil carried down from the highlands of Abyssinia and given to the land annually during the overflow, has transformed the desert into the fertile strip of valley and the delta. E. and W. of this cultivated land lies the waste of deserts with occasional oases. The delta is a fan-shaped plain, formed of a deep layer of mud and grey sand, lying on the yellow quartz sands, gravel and clay, which were laid there in prehistoric times by the sea. It is an extraordinarily fertile stretch of land, watered by the two branches of the Nile, the Rosetta and the

Damietta, and intersected with canals. The valley of Upper E. is narrow, and the fringe of mts. on either side are of no great height, so that the landscape varies but little and might appear to be monotonous but for the rich and wonderful colouring of all the scenery, the vivid green of the fields, the rich red-brown of the riv., the bright yellow of the rocks with overhead a deep blue sky and brilliant sunshine.

gradually in June and continues rising until the middle of Sept. ; it then remains stationary from two to three weeks, rising again until the end of Oct. ; it is then at its highest level and commences gradually to fall, until by May it is once more at its lowest. The riv. rises from 21 to 28 ft. ; when it did not reach this level the crops failed, and when it exceeded it the land was overflowed and ruin faced the people.



D. McLeish

THE TEMPLES OF THE ISLET OF PHILÆ, ON THE RIVER NILE

The beautiful temple is surrounded by the waters of the Nile. It is at times almost completely submerged owing to the action of the dam at Aswân

The coast-line of E. covers about 600 m., and except at the delta is rock-bound, possessing no harbours worthy of mention. The delta coast-line is low and forms two bays, one being the bay of Aboukir. The source of the Nile (*q.v.*) is Lake Victoria (Victoria Nyanza) discovered by Speke, 1858. The riv. flows into E. proper N. of the second cataract, a little S. of Wadi-Halfa. The Blue Nile, which rises in Lake Sana, joins the Nile at Khartoum ; this stream brings down an immense quantity of red mud. The trib. Atbara joins 200 m. below Khartoum. The cataracts are six in number (*see NILE*). The important feature of the riv. is its annual inundation. At the end of May the riv. is at its lowest level ; it rises

Nowhere in the world is there such a large pop. depending solely on the produce of the soil. As the climate is exceedingly dry, the annual rainfall averaging about 1.50, irrigation became as early as the second Dynasty (about 4514 B.C.) an object of national importance. All through the ages can be marked the tireless persistence and mechanical ingenuity employed in the problems of irrigation. During the nineteenth century, Mehmet Ali Pasha began a gigantic system of canals, locks, and weirs. A Fr. engineer of considerable ability, Mougél Bey, was employed to carry out this difficult task ; his great barrage across the Nile, at the apex of the delta, is still a very impressive work ; unfortunately the system was a failure.

Later, Brit. engineers undertook the management of irrigation, and in 1902 the Nile dam, at the head of the first cataract above Aswân, was completed. It had been planned to raise the dam to such a height that the beautiful temples on the islet of Philæ would have been submerged; for five years they were spared, but in 1907 the dam was raised, and during several months of the year the ruins are no longer visible. The chief lakes of E., from W. to East, are Marcotis, Edku, Burlus, and Menzala; these lie only a few m. from the coast and are shallow and brackish. The seven famous natron lakes lie in a valley in the desert, 80 m. W.N.W. of Cairo. In the prov. of the Fayum is the Birket-el-Kerim, 30 m. long and 5 m. wide, forming the remains of the Lake Moeris, which Herodotus believed to have been artificially constructed. Certainly Amenemhat III. completed what his fathers had begun by building a vast embankment and reclaiming an area of 40 sq. m., also carrying out a scheme of irrigation in connection with this great natural reservoir. The climate is extremely dry. E. lies in an almost rainless area. The days are warm and the nights are cool. Jan. is the coolest month. On the coast rain falls during the winter months, but snow is unknown. In Sinai, snow occasionally falls during the winter, and heavy storms of rain occur which flood the rocky ravines and drown both men and beasts; these, however, are only occasional and irregular. One interesting feature of the climate is the continuous N. wind, which blows throughout the year, and the sailing boats are thus able to ascend the Nile against the strong current. During the spring the *Kamsin* occurs, a hot, dry S. wind laden with sand, forming a yellow stifling fog almost obscuring the sun; it lasts from one to three days. There are 5 large oases or fertile places in the W. desert, Siwa, Baharia, Kharga, Dakla, and Farafra. These have been occupied since 1600 B.C. Kharga possesses a temple of Ammon, built by Darius I., and also other interesting ruins of the time of the Ptolemies. Siwa contains the oracle temple of Jupiter Ammon, consulted by Alexander the Great. The tn. is built on the rocks and has the appearance of a fortress. It was used for many years as a place of banishment for criminals.

Minerals.—Gold and precious stones were formerly found and mined in the hills by the Red Sea. The Moslem conquest caused the abandoning of this industry. The turquoise mines of Sinai are still productive. The first Dynasty of Egyptian kings, about 4777 to 4514 B.C., possessed these mines and had them worked, and from that time down, through all the centuries, the turquoise from Sinai have been famous. There are emerald mines at Jebel Zuhara. Salt is obtained from Lake Marcotis in large quantities; alum is found in the W. oases; carbonate of soda is taken from the natron lakes; hæmatite iron is obtained in considerable quantities from Sinai and the Red Sea hills. Porphyry quarries once existed,

with granite quarries, at Jebel-el-Fatira, and during the Rom. occupation were extensively worked. Gold-mining began once more in 1905 at Um Rus and Um Garalat. The riparian dists. of the lower valley of the Nile are ill-provided with workable mineral deposits, with the exception of abundant building materials. The mineral resources of E. are therefore situated in its otherwise barren deserts, and this fact has retarded exploration and development, though in recent years much progress has been made. The prin. mineral products in 1946 were petroleum (1,282,000 metric tons), phosphate rock (294,047 tons), manganese ore, gypsum, natron, and sodium sulphate.

The flora of E. is not of a great or large variety. There are no forests or woods, and all available land is use for agric. purposes. Date palms grow wherever they are allowed, together with the sunt tree and tamarisk, the mimosa, the eucalyptus and the cypress, also some few others. The rose grows freely, and the violet and many kinds of daisies and poppies. Jasmine is largely grown, being much loved by the Arab and Egyptian. The famous papyrus is not now grown in E., and the lotus flower (a water lily) blooms no longer on the Nile, though found in the delta and cultivated in private gardens.

Fauna.—The camel and the ass are the common domestic animals of E. The camel is not indigenous, but was introduced at an early period. Horses are few and of very inferior type. There are not a great variety of wild animals; the hyena, jackal, and fox are numerous, and wild boars are still found in the delta. Wild cats and hares abound, and snakes and reptiles of various kinds are exceedingly numerous. The crocodile and the hippopotamus, once famous and sacred, no longer dwell by the Nile in E. The bird life is rich; vultures, eagles, hawks, and buzzards are found in quantities, and water fowl in large varieties, but the sacred ibis has gone. The five most familiar animals and flowers, usually associated with anct. E., are no longer common, i.e. the crocodile and hippopotamus, the papyrus and the lotus, and the sacred ibis; the sixth most familiar object, the beetle (the scarabæus), still flourishes in many varieties.

The population of E. according to preliminary figures of the census of 1917, was 19,090,000 the number of males being only 200,000 less than females. There are three distinct elements in the native pop. The largest or 'Egyptian' element is a Hamito-Semitic race, known in the rural dists. as *fellahin* (ploughmen or tillers); a second element is the *Bedouin*, or nomadic Arabs of the Libyan and Arabian deserts, of whom about one-sixth are true nomads, and the remainder semi-sedentary tent-dwellers on the outskirts of the cultivated land and of the Nile valley and the Fayum. The third element is the *Nubian* of the Nile valley between Aswan and Wadi-Halfa, of mixed Arab and negro blood. The fellahin are chiefly Mohammedan in faith, though

the Copts (*q.v.*), also natives of E., have kept their Christian belief. The fellah is a hard-working and industrious person, of big build, with a fine oval face, smooth black hair (the head is usually shaved), and well-formed features. The women are often of great beauty, both in form and feature, though they lose their youth early. The Copts are racially the purest descendants of the anct. Egyptians. The colouring of the fellah varies from a fair yellowish shade in Lower E. to a deeper tone in Middle E. and in Upper E. the majority are a deep bronze. The Hamitic tribes speak a language of their own, are probably descended from the Blennuycs, preserving many non-Islamic religious practices and regarding the serpent as sacred. The foreigners (numbering in 1937 about 240,000) are mainly Gks., Turks, Its., Brit., Fr., Syrians, Levantines, and Persians. Of the total pop. some 80 per cent are illiterate and live in great poverty. Malnutrition and disease are rampant. A very high percentage of the people suffer from trachoma which often ends in blindness; more than half have disabling parasitic diseases; some 15 per cent are malarial and almost as many suffer from various forms of venereal disease. Before the Second World War expenditure on public health averaged no more than 8s. per head, compared with £7 in Britain. In religion 9 out of 10 Egyptians are Muslims, a fact which in part explains the remarkable resignation and even cheerfulness with which the masses endure their lot. Most of the people live in squalid hamlets of flat-roofed huts, without sanitation, clean drinking water or conveniences of any kind. The nearby riv. or canal is the public well, washing place and receptacle for every kind of refuse. Black-robed veiled women crouch at their doors pounding grain in mortars or performing other primitive chores while the fellah labours in the flat fields, where the rich dark soil is threaded by irrigation ditches. Desperately ignorant and fanatically conservative, the fellahin are the silent, suffering beasts of burden who uphold the glittering façades of Cairo and Alexandria. Thanks to the modern systems of irrigation the production of cotton has increased in E. by more than half in forty years and the country is now also self-supporting in food; but whether this increase in food production can offset the steady rise in pop., without a drastic reduction in the more profitable cash crop, cotton, from which the great landlords draw much of their wealth, is one of the problems of the future. The chief *tus.* of E. are Cairo (*q.v.*), the cap., on the E. bank of the Nile, built by the Arabs at the head of the delta about 12 m. from the div. of the riv., pop. 2,100,400; Port Said (*q.v.*), 178,400; Alexandria (*q.v.*), chief seaport, 928,200; Damietta (*q.v.*), 53,800; Rosetta (*q.v.*), 28,800; Suez (*q.v.*), S. entrance to the canal, 108,200. In the interior of the delta are a few flourishing *tus.*; the chief is Tanta, 139,800. The chief *tn.* in Upper E. is the cap. of the prov. of Fayum, Medinet-el-Fayum,

72,400. Other large *tus.* are Mansûra, 102,500; Asyût, 88,700; Zagazig, 82,900; Mahalla el Kubra, 115,500; Dammanhur, 84,900; Minya, 69,600; Beni Suef, 56,300; Giza, 66,200; and Qena, 39,600. Many of the modern *tus.* are built upon the sites of anct. cities referred to later in the section on antiquities. The great industry of E. is agric. About 4,000,000 acres are under perennial irrigation, and from these, two to three crops can be annually harvested; the land under basin-irrigation covers 1,750,000 ac., and only one crop can be grown in the year. Cotton, rice, and sugar are the main summer crops, and maize, millet, wheat, barley, and flax form the winter crops. Although modern iron ploughs and other agric. machines have been introduced, the native wooden plough is still largely used. In the Fayum there are fields of roses, grown for rose-water and perfumes; saffron, indigo, and henna are also grown. The cotton industry is increasing every year, the average over 1897 to 1905 was ££14,000,000; over 1924 to 1928 ££15,777,088. In 1936-37 the cotton crop exported was nearly 11 million qantars (1 qantar of unginced cotton equals 315 lb.; of ginced cotton, 100 lb.), and supplied nearly 75 per cent of the total value of the exports of E. The common fruits are the date, fig, orange, citron, grape, banana, peach, and apricot. In smaller quantities melons are grown and mulberries, also olives. The date is the most valuable of all the fruits, forming one of the chief foods of the people.

The *currency* is based on a gold standard. The Egyptian pound equals £1 0s. 6½d. sterling, divided into 100 piastres. There are silver piastres, value 20, 10, 5, and 2, and nickel pieces of 1, ½, ¼, and ⅛ of a piastre, and in bronze 5 and 2.

For purposes of local gov. the chief *tus.* constitute 5 governorships, and the remaining country is divided into fourteen provs., further divided into dists. The provs. in Lower E. are: Beheira, including the oasis of Siwa, Gharbiya, Minûhiya, Daqahliya, Qalûbiya, and Sharqiya. In Upper E.: Giza, Beni-Suef, Fariyûm, Minya, Asyût, Gurga, Qena, and Aswâh. For the Anglo-Egyptian Sudan, under a governor-general appointed by the king of Egypt with Brit. approval, see SUDAN.

Education on native lines has long been given in elementary vernacular schools. The native system of education is completed by the more promising pupils at the Azhar Univ. in Cairo. There are nearly 4000 *maktabs* (elementary vernacular schools) with nearly 400,000 male and 240,000 female pupils. The gov. primary schools give a four years' course and prepare for admission to secondary, agric., and other special schools. There are 2 univs. with colleges of medicine, law, engineering, fine arts, commerce, science and agric. at Cairo. Much assistance is given to education by private enterprise and benevolence, and foreign schools abound. *Justice*.—The old native tribunals presided over by the *Qadis* now have jurisdiction only in matters of personal law, such

as marriage or succession and, particularly, in *wakfs*, i.e. charitable foundations. The *Mogalis Hasbiya*, reorganised in 1925, deal with matters of guardianship; but in matters of personal law other than intestate succession, non-Moslems are, in general, subject to their own Patriarchate. In other matters, nationals are justiciable before the National Courts estab. in 1883; these are summary tribunals for the most part with civil jurisdiction in matters up to a low pecuniary limit and criminal jurisdiction in offences punishable by imprisonment up to three years or by fine. The *Judicial Delegations* have similar jurisdiction. They are presided over by one judge. There are also some thirteen *Central Tribunals*, each of the chambers of which consists of three judges; and three *Courts of Appeal*, at Cairo, Assût, and Alexandria. Civil cases not within the competence of the Summary Tribunals are heard in the first instance by the Central Tribunals, with an appeal to Courts of Appeal. The Central Tribunals also hear civil and criminal appeals from the Summary courts. Serious crimes are tried at the Central Tribunals by three judges of the Court of Appeal sitting as an Assize Court. In 1931 a separate *Court of Cassation* over and above the Courts of Appeal was set up. The so-called 'Cantonal' Courts, numbering over two hundred, and composed of vil. notables with a general civil jurisdiction in suits involving no more than £5 and a petty criminal jurisdiction were suppressed in 1930 and their jurisdiction transferred to the Summary Tribunals. The Capitulations (*q.v.* and see *infra*) were abolished by the convention of Montreux, which came into force in 1937.

The police force, which is administered by the Ministry of the Interior, embraces city and provincial police. The city police muster some 300 officers (75 Europeans), about 500 European constables and nearly 6000 men, and the strength of the provincial police is returned at 369 officers and 6160 men.

The Egyptian army.—The fellah, as a soldier, is useless without capable officers: when under good control he is excellent. The anct. conquests have been attributed mainly to mercenaries. For centuries foreign legions were employed, and Mehmet Ali was the first to use conscription among the fellahs. The system employed was so much loathed and dreaded that the peasants mutilated themselves rather than become soldiers. They blinded themselves in one eye or cut off the fingers on their right hand, but even this did not save them, one-eyed battalions were formed, and the men with injured hands were taught to shoot from the left shoulder. It was not until 1883 that a fair system was arranged. In 1885 an equitable law was made and greatly improved upon in 1900. The Army in 1932 comprised 3 infantry brigades, 2 squadrons of cavalry, 4 artillery batteries, 1 company of garrison artillery, 1 motor machine-gun battery and 1 engineer company. Its total strength was then 12,000.

In 1938 E. had an air force of 18: squadrons. Service is nominally compulsory on all Egyptian subjects between 19 and 27, but certain classes are exempt, and exemption may be purchased for ££20, if paid before the ballot.

Finance.—In 1937-38 the revenue and expenditure balanced at ££36,120,000. In 1947-48 revenue and expenditure balanced at ££103,257,800. The total exports in 1937-38 amounted to ££39,760,000 and the total imports to ££38,038,000; in 1946 exports were ££63,680,500 and imports ££83,247,800. In 1943 the consolidated debt stood at ££86,669,840 or, together with Egyptian Tribute Loans, ££92,027,020. These debts were converted into a National Loan by a law of Sept. 7, 1943. The new loan amounts to ££86,001,550.

Railways.—The prin. lines radiate from Cairo to Alexandria (and on to Rosetta), Damietta, and Ismailia (continuing northwards to Port Said and southwards to Suez). From Cairo the line runs southwards for a distance of over 500 m. to Shellal, the first Cataract. At this point a steamer connexion runs to Wadi Halfa, connecting the Egyptian State with the Sudan Government Railways. Westwards from Alexandria and near the coast runs a line to the frontier at Sollum, and on to Tobruk, giving the possibility of later linking with Tripoli. The total length of the Egyptian State Railways (excluding the Auxiliary Railways of Upper E. and the Western Oases Railways) in 1915 was nearly 4200 m. The gauge is standard (4 ft. 8½ in.), with the exception of that to the W. oases, which is 2 ft. 3¼ in. gauge. There are two other State-owned lines in E., the Auxiliary Railways of Upper E., consisting of 282 m. of standard gauge, and the Western Oases Railways, a length of 110 m., connecting the oases of Kharga with the Nile Valley. In addition to the gov. lines, there are nearly 900 m. of light railways exploited by public companies. A swing bridge, constructed after 1939, across the Suez Canal, estab. connexion between Cairo and Beirut, over the northward extension of the Palestinian railway system from Haifa to Tripoli in Syria, and there is now a continuous line joining E. and Istanbul.

Exploration.—The exploration which has been carried on for so many years by Egyptologists, met with a wonderful find on Nov. 4, 1922, when an Englishman, Howard Carter (*q.v.*), discovered the tomb of Tut-ankh-Amen in Thebes. The tomb was opened by Carter and the earl of Carnarvon (*q.v.*) on Nov. 26. Despite the fact that the tomb had been rifled some time after the king's burial, the contents were found practically undamaged and in a wonderful state of preservation. The discovery must be ranked as the most important that has yet rewarded the efforts of explorers (see TUT-ANKH-AMEN). But though so far (1931) this find has dwarfed all others before or since, many others, valuable to the archaeologist and historian, have been made in the past few years. In 1925 great interest centred on Sakkarah, where the work begun in 1924 by the Dept.

of Antiquities in investigating the area surrounding the Step Pyramid, the oldest stone building in the world (3rd dynasty), reaped its reward in the bringing to light of a temple built to commemorate the thirty-year jubilee of King Zoser. There were found near the temple a colonnade 85 yards in length, which seems to have formed the main entrance to the pyramid enclosure.

This colonnade comprises forty-eight columns of white limestone, arranged in pairs, and all were originally 5 metres high and 1 metre in diameter. The shafts are not fluted, like those found shortly before, but are carved to imitate a bundle of reeds. The E. and W. end of the colonnade have curious imitation doors carved in the masonry of the walls, having the appearance of doors swung open. In a bay space between the columns were found the heads in diorite representing foreign prisoners, and in the style of the so-called Hyksos statues, and now regarded as belonging to the middle kingdom. The colonnade is the work of Imhotep, the first known architect, who was subsequently canonised and worshipped as the patron saint of wise men and scribes. On the wall near by was found the record of a tourist eleven centuries B.C., who stated, in a fair round hand, that he had taken a holiday to see the wonders of Sakkara, after having spent sev. years in campaigns, of which he was the sole survivor of his troop. In 1925 also was found at Dair el Bagara, near Thebes, among other things, Queen Hatshepsut's statues. Karnak excavations in 1926 disclosed a temple to Pharaoh Akhenaton, thus supplementing the work begun the previous year when two enormous statues of Pharaoh Akhenaton were discovered. The area being cleared in 1926, six more similar statues, having the same grotesque facial and bodily characteristics as the first two, were unearthed. The temple was found behind the statues, and though the existence of the temple had been recorded by historians it had not up to 1926 been found. The statues evidently formed the courtyard to the temple, and were in good condition. Other finds of 1926 included a bronze statuette of a singing girl unearthed in the remains of Fustat and an anct. plough found at Thebes.

The most notable discovery in 1927 was that of the secret tomb of Queen Hetepheres, mother of Pharaoh Khufu (Cheops) by the Boston-Harvard Expedition at Giza; but the mummy itself was not found, having evidently been destroyed by robbers. What was found was an alabaster canopic box on a wooden tray with a perforated pottery bowl covering the box. The box had four rectangular compartments, each containing a mass of organic matter, probably the Queen's viscera removed at the time of mummification, and the theory is that the officials, dreading the wrath of Pharaoh Khufu if the violation of the mummy were discovered, conceived the plan of reclosing the sarcophagus as it originally was, before acquainting Pharaoh of the robbery of the gold and other ornaments.

The Vienna Academy of Science also made finds of tombs near the Giza pyramids, including a group of statuary of Senab, wife and children. The Fayum oasis has also proved a fertile hunting field for the archaeologist. Dr. Johnston, the Oxford Univ. librarian, conducted excavations there just before the First World War and discovered numerous interesting articles including women's vanity bags and children's toys by no means dissimilar from those of to-day. Excavation work has been continued there almost without a break for many years and as recently as 1930 some interesting Rom. remains were found at Tebtunis. The study of Philistine tombs and Israelitish culture has been furthered by various discoveries in 1929 at Tel-el-Amarna, one of genuine human interest being that of a child's toy thousands of years old, representing a monkey in a chariot drawn by monkeys. This was found by the Egyptian Exploration Society, which body also found there a number of tools, ornaments, and weights. In 1932 a fourth pyramid was discovered at Giza.

HISTORY.—The origin of the Egyptians is still a matter of dispute. It is quite probable that they were Semitic, though they appear to belong to the Berber type of N.E. Africans; they certainly possessed many characteristics of the fair-skinned Libyans; they have no real negroid trace about them, though probably there is a strain from intermarrying; thus it is likely that they may have been a fair-skinned indigenous race, mixed also with people of Asiatic origin, and a certain amount of negro blood. The earliest types, as pictured by themselves on monuments, show men of fine build with no trace of the negroid type; the males are painted red-brown and the females a light yellowish tint. The earliest prehistoric remains are at Thebes, viz. so-called palæolithic flints, rudely chipped, but these may have been produced by natural forces. On the desert implements of quite clearly defined form have been discovered. The Neolithic remains are found in considerable quantities and in interesting forms and varieties, though their age is doubtful; the prov. of the Fayum is very rich in these relics. The Egyptians appear to have learnt the use of metals very early; copper and bronze instruments of a very early date have been found. Apparently iron was not familiar, or at least not freely worked or used in E., although countries such as Syria sent it to them as tribute yearly. In the Brit. Museum (Case A, first Egyptian room) is the body of a man whose grave was discovered on the W. bank of the Nile in Upper E.; he belonged to the later Neolithic age, a relic of remote antiquity. He was buried on his left side with the knees drawn up nearly to the chin; the hair and skin are fair, the fingers long and slender; by the side of the body were flint knives and black and red and buff pottery, pointing to the belief in the existence of a future life even in that prehistoric period. The first really historical king is Mena (Menes of the Gks.); he was king of the

anct. empire, a Thinite from the city of This; he founded the kingdom of white-walled Memphis. Mena is the first king of the First Dynasty, i.e. the family or line of kings governing successively. Manetho, the Egyptian priest-historian, who lived in the reign of the early Ptolemies, first divided the kings of E. into dynasties, naming and numbering them; unfortunately only fragments remain of his valuable history. Manetho's list of kings and dates is scarcely trustworthy. Very few people are agreed as to the actual dates, there being a slight discrepancy of 2000 years between the leading authorities in the date of the first Dynasty, some persons placing it as far back as 5869 B.C., others as late as 3315 B.C. The following table of Egyptian kings, with dates, is a rough attempt to place them correctly and give some idea of about the time they existed.

The Old Kingdom.—First Dynasty (from the city of This): Menes, or Menu, 4400 B.C.; Teta, or Atet, 4366; Ateth and Ata, of whom nothing is known; Hesept, or Semti, 4266; Semen-Ptah, or Semsu, 4200. *Second Dynasty* (from the city of This): Neter-bau, or Kha-Sekhemni, 4133; Ka-ka-u (?), 4100 (Ra-Neb may be the same); Hetep-Sekhemui (?); Ba-en-Neter (?), 4066. Names have been found of kings of this dynasty or whom at present very little has been discovered, such as Uatchnes, Senta, Neferikara, Neferkaseker, Hetchefer, Bebl, or Tchatchai. *Third Dynasty* (from Memphis): Neb-ka, 3900; Zeser, or Ter-sa, 3866. Other names appear as kings of this dynasty but details are wanting. Hen-Nekht, Tchaser-Teta, Setches, and Nefer-ka-Ra-Huni. The dates of these kings have not been settled yet. *Fourth Dynasty* (from Memphis): Sneferu, 3766; Khufu, or Cheops, 3733; Khaf-Ra, or Chephren, 3666; Men-ka-Ra, or Mykerinos, 3633. Other kings are identified with this dynasty, Tet-f-Ra, placed between Khufu and Khaf-Ra, Shespeskaf probably succeeded Men-ka-Ra. *Fifth Dynasty* (from Elephantino): Us-Kaf, or User-kaf, 3566; Sahu-Ra, 3533; User-en-Ra-An, 3433; Tat-ka-Ra, or Asa, 3366. Other kings of this dynasty are, Kahaa, Neter-ari-ka-Ra, Shop-ses-ka-Ra, Kha-nefer-Ra, Mem-ka-Ra-Heru, and Unas, 3333. *Sixth Dynasty* (from Memphis): Teta, 3300; Pepi I., or Ra-Meri, 3233; Queen Men-ka-Ra, or Nitocris, 3066. Other kings of this dynasty are: Userka-Ra, Mer-en-Ra, Nefer-ka-Ra, or Pepi II., and Mer-en-Ra Tchefan (?). *Seventh Dynasty* (from Memphis): very little is known of this dynasty at present; it appears to have possessed seventy kings in as many days. *Eighth Dynasty* (from Memphis): apparently had twenty-seven kings, of whom we have discovered nothing. *Ninth and Tenth Dynasties* appear to have had nineteen kings each, of whom we know nothing. *Eleventh Dynasty* (the Old Theban).

The Middle Kingdom.—Antefa, 2600 or 2700. Many names belong to this dynasty, but up to the present time very little has been discovered about them;

many of them end with the name of Menthu-hetep. Sankh-ka-Ra (c. 2500) appears to have arranged the first voyage to the land of Punt. *Twelfth Dynasty* (from Thebes): Amenemhat I., 2486; Usertsen I., 2433; Amenemhat II., 2400; Usertsen II., 2370 or 2366; Usertsen III., 2340 or 2333; Amenemhat III., 2300; Amenemhat IV., 2265; Queen Sebek-Neferut-Ra, 2255. *The thirteenth, fourteenth, fifteenth, sixteenth, and seventeenth Dynasties* are exceedingly difficult to make clear, as so very little is known. The thirteenth Dynasty apparently reigned at Thebes, and Sebekhotep I. was its first king.

The Hyksos, the shepherd kings, probably nomad Semites, invaded E. and estab. themselves, during the Fourteenth Dynasty to Xoia. The fifteenth is purely a Hyksos dynasty; some of their names were Salatis, Beon, Apachnas, Apophis, Yannas, and Asses. The Seventeenth Dynasty saw the end of the Hyksos.

The New Empire.—Eighteenth Dynasty (from Thebes): Aahmes I., or Amasis I., 1635; Amenhotep I. (?); Tehutimes I., or Thothmes (Tethmosis) I., 1590, ? 1550; Tehutimes II., or Thothmes II., 1565 (?); Queen Hatshepsu, 1552; Tehutimes III., or Thothmes III., 1530; Amenhotep II., 1500; Tehutimes IV., or Thothmes IV., 1470. Amenhotep III. (the Memnon of the Gks.), 1455, ? 1450; Amenhotep IV., or Khun-Aton, or Akhnaton, 1420 (?); Saa-Nekht (?), 1400; Tut-ankh-Amen (?), 1390; Ai (?), 1380; Hor-em-heb, 1368 (?). *Nineteenth Dynasty* (from Thebes): Ramesses I., 1365, ? 1370; Seti I., 1355; Ramesses II. (the Sesostris of the Gks.), 1345 (?); Menephtah, or Merenptah, 1285; Seti II., or Merenptah, 1250; *Twentieth Dynasty* (from Thebes): Set-Nekht, 1235; Arsu, or Ariser, probably a Syrian conqueror; Ramesses III., 1225. After this successive Ramesses continue to twelve, the thirteenth prince of the name was murdered or died, and Her-Hor, the priest, succeeded. *Twenty-first Dynasty*: E. was divided at this period. *Kings of Tanis*: Smendes, Pasebkanut I., Amen-en-Apt, Sa Amen, Pasebkanut II. *Kings of Thebes*: Her-Hor or Hor-Hen, Piankhi, Piankhet I., Piankhet II., Masaherth, Men-Kheper I., Piankhet III. *Twenty-second Dynasty* (from Bubastis): Shashank I., or Shishak, 945, ? 950; Uasarken, or Osorkon I. (?); Theckelet I. (?); Osorkon II. and others (?). *Twenty-third Dynasty* (from Tanis): Peta-Bast (?), 766; Osorkon III.; Piankhi, king of N. Sudan, was reigning at the same time. *Twenty-fourth Dynasty* (from Sais): Bakrennef (the Bocchoris of the Gks.) (?). Other kings are ascribed to this dynasty, of whom nothing is known. *Twenty-fifth Dynasty* (from Nubia): Shabaka, or So, 700 (?). Other kings are named, but their hist. is still obscure. *Twenty-sixth Dynasty* (from Sais): Psamthek I., or Psammetichus, 666 (?); Neku II., 610, ? 612; Psamthek II., 594; Uah-Ab-Ra, or Iophra, or Apries, 593; Aahmes II., or Amasis II., 570 (?); Psamthek III., 526 (?). *Twenty-seventh Dynasty* (from Persia): Cambyases,

527; Darius I., 521; Xerxes I., 486. There are other kings of this dynasty, some Persian, some Libyan, some native princes; see historical record below. *Twenty-eighth Dynasty* (from Sais): Amen-rut, a native prince, 405 (?), 399 (?). *Twenty-ninth Dynasty*: five kings of small importance. *Thirtieth Dynasty* (?): Nekht-Heru-Hebt, 378 (?). Some few others, unknown, belonging to this dynasty. *Thirty-first Dynasty*: Ochus, or Artaxerxes III., 340 (?), 338 (?); Alexander the Great, 332.

The Ptolemaic Period, 304. There are thirteen Ptolemies, followed by Cleopatra and her son, Ptolemy XIV.

The Rom. Period, 30 B.C.

The Moslem Conquest, A.D. 639.

This table of dynasties gives a small idea of the rulers of E., and below is a short record of the most important events of the best known periods, but it must be remembered that every year the search of the archaeologist is rewarded with fresh facts coming to light which may alter the time and even the name of the chief actors in many of these events. The first dynastic king of E. was Mena, called Menes by the Gks. Tradition says he founded Memphis; he also united the N. and S. kingdoms. The name of Aha has been identified with Menes. He resided at Abydos as well as at Memphis. His tomb was discovered at Abydos, a large brick-lined pit with props to support an inner lining of wood. Tradition asserts that he was slain by a hippopotamus. The great interest which centres on this king and his whole dynasty is due to the remarkable stage of civilisation the country had reached. The furniture of inlaid ivory and ebony, the carved alabaster vessels, and the copper-work, also the wonderful skill of the gold-workers, examples of which have been discovered, prove how far advanced the Egyptians were already at the early date of about 4400 B.C. Hieroglyphic writing was coming then into common use, and a state religion and priestly organisation were fully regulated and estab. During the third Dynasty, Tchoser (or Zoser) built the great step pyramid at Sakkarah. The great Sphinx of Giza may have been built during this dynasty, though some authorities attribute it to the fourth. It is interesting here to state that when the king became (as Menes) ruler of Upper and Lower E. the red crown of the delta was worn outside the white helmet of the kingdom of the valley; this curious head-dress of royalty has become familiar to all who see the various statues in museums. The *wreath* worn by kings was the model of the African cobra or asp whose name 'Ouro' signifies king. It was represented with the body erect and the hood expanded. The fourth dynasty kings were the great builders of pyramids (*q.v.*). The first King Sneferu finally estab. the peninsula of Sinai as part of the Egyptian dominion, with its rich copper and turquoise mines. Cheops or Khufu built the Great Pyramid. His reign seems to have been marked by oppression of his people. Tradition says the temples were closed

and private labour ceased, so that all persons could be employed to build the Great Pyramid. Khaf-Ra, the Chephren of the Gks., built the Second Great Pyramid; he also appears to have been an oppressor of his people. The Third Great Pyramid was built by Men-ka-Ra. Many legends attach themselves to this king; he appears to have been beloved by his people; the temples were re-opened and the people returned to labour at their proper occupations. During the Fifth Dynasty few great monuments were built. The Palermo Stele or Stone, engraved with various events and the names of some pre-dynastic kings, belongs to this



EGYPTIAN SCULPTURE: QUEEN
NEFERTITI

period, also the papyrus of accounts and the Proverbs of Ptah-hotep. Some traditions place in the Sixth Dynasty Queen Men-ka-Ra, the Nitocris of Herodotus, round whom have gathered many legends. Some of the pyramids at Sakkara were built during this dynasty, also the red granite Sphinx of Tanis. The city of white walls received its later name of Memphis at this time. Herkuf, a prince of Elephantine, who led many successful caravan expeditions, brought from the land of Punt by way of the Red Sea a dancing dwarf to please the boy king, Pepi II., whose letter of boyish delight to Herkuf is fully engraved on the facade of the latter's tomb. During the Eleventh Dynasty Sankh-ka-Ra despatched a successful expedition to the land of Punt, bringing back spices and scented gums, much prized by the Egyptians for the purpose of embalming. The Twelfth Dynasty

estab. the power of Thebes after a period of anarchy. The monuments of this period are numerous and of splendid design and workmanship. The great temple of Amen at Thebes was built, and the papyrus of Amenemhat I., containing the famous instructions to his son, belongs to this dynasty. These kings were great irrigators, and Amenemhat III. completed the work of Lake Moeris; he also built the labyrinth at Hawara. Art, sculpture, architecture, and trade flourished during his reign; many interesting buildings and statues belong to this period, also very beautiful jewelry. The following period of the thirteenth, fourteenth, fifteenth, sixteenth, and seventeenth Dynasties is a time of doubt and confusion. Three or four hundred years seem the probable time of the whole of these dynasties, and the Fifteenth Dynasty seems to mark the arrival of the Hyksos, or shepherd kings, who invaded E. and apparently conquered her without a blow. Manetho in his hist. describes them as the foreign Phœnician kings. Josephus calls them the children of Israel. It is almost certain these people were Asiatic, possibly a nomadic tribe from the Syrian desert, but this matter is still obscure, and the problem remains unsolved. The bitter hatred of the Egyptians for these invaders roused them at last to a more martial spirit, and the final and complete expulsion of the Hyksos opened one of the most glorious periods of Egyptian hist. Relics of the Hyksos are very scarce. They were termed Barbarians by the Egyptians, and Josephus quotes from Manetho, 'We had formerly a king whose name was Timaios. In his time it came to pass, I know not how, that God was displeased with us, and there came up from the East in a strange manner men of ignoble race, who had the confidence to invade our country and easily subdued it by their power without a battle.' Probably the horse and the war-chariot were introduced into E. by the Hyksos. The princes of Thebes who were vassals of the Hyksos at last revolted. One named Seqenen-Ra III., who was married to an Egyptian princess of pure blood, determined to throw off the yoke of the Barbarian. The Hyksos king ordered him to worship their god Sutekh; he refused, and the war of independence began. Seqenen-Ra appears to have been a determined man of great courage; when his mummy was discovered at Deir-el-Bahri, and subsequently unrolled at Cairo, the skull was hacked and split, the lower jaw-bone was broken and there were other large wounds; obviously he had died fighting for his country's freedom. His son, Ka-mes, continued the bitter struggle, and at last Aahmes, or Amasis, I. captured the stronghold of the Hyksos at Avaris and expelled the Barbarians. Aahmes became the founder of the Eighteenth Dynasty. This king rebuilt the temples and the cities ruined by the Hyksos, and at last estab. law and order. He was a great soldier, and fought successfully in Syria and in Nubia. Once more E. became a strong rich country. Amenhotep

I., his son and successor, founded the brotherhood of the Priests of Amen.

Thothmes I., or Tehutimes I., followed Amenhotep; this great warrior king subdued Cush, or Nubia, fixed the boundary of his kingdom at the fourth cataract, and carried his arms victoriously to the Euphrates. He built on to the Theban temple of Ammon or Amen at Karnak (q.v.), which gradually became the largest temple in the world. He was the first king to be buried in the valley of the tombs of the kings of Thebes. Thothmes II., who succeeded, married his half sister, Hatshepsut; after her husband's death she became sole queen of E. Thothmes III., her nephew, was nominally king also. Hatshepsut was a woman of forceful character, and her father's military genius appears to have descended to her, and in her capable hands many warlike expeditions were successfully carried out. She was a great builder, among her works being the famous temple of Deir-el-Bahri. Her design was to make a paradise for the god Amen, and a large expedition to Punt was organised to obtain the necessary incense trees and spices. A fleet was sent off and reached Punt in safety, returning laden with ivory, gold, ebony, myrrh, dog-headed apes, leopard-skins, and thirty-one incense trees. These trees were planted on the terraces of the temple for the pleasure of the god. This famous queen usually dressed as a man, but allowed herself to be described as a woman in her inscriptions. On her death Thothmes III. became sole king; one of his first acts was to deface the late queen's monuments and replace her name either by his own or his father's. He seems to have been filled with rage and hate at the very thought of her, regarding her as a usurper of his rights. Afraid of her during her life, his only revenge after her death was an act of vandalism utterly unworthy of the great warrior king he afterwards became. Thothmes III. built an enormous number of temples both at Memphis, Abydos, Denderah, Coptos, etc., his greatest work being the colonnade at Karnak; he also set up sev. magnificent obelisks. His conquests had made the country exceedingly rich. His campaigns in the revolted Syria, in Libya, and Ethiopia were splendidly successful; he secured the Phœnician ports, and Crete, Cyprus, and the Ægean Isles sent ann. tribute to him. He died at a very advanced age; his mummy was wrapped in a fine linen sheet inscribed with the 154th chapter from the Book of the Dead.

After the unimportant reigns of two kings followed Amenhotep III., the Memnon of the Gks., one of the richest kings E. ever saw. The country was now at the height of her splendour and prosperity. Thy, the wife of Amenhotep, was a very beautiful and remarkable woman. It is not yet perfectly certain whether she was a Syrian by birth, but she certainly seems to have been of foreign extraction. Her father, Yuas, may have been a Syrian, and her mother, Thuas, an Egyptian. Amenhotep's buildings were very extensive. Among them are the Apis chapels at Sakkarah, the temple to the Theban

Triad at Luxor, one of the finest monuments of Thebes. He also built a famous palace on the W. bank of the riv., under the Theban hills, with a large pleasure lake for his beloved queen, Thyi; it must have been a place of great beauty. The excavations there have brought to light a dim idea of this age of wealth and luxury; among other things of interest found in the palace were bath-rooms, eight in number, properly drained. The two great Colossi known to the Gks. as the Colossi of Memnon were carved for Amenhotep; they represent himself seated, and look out over the W. plain of Thebes; one was famous from a sound which was said to issue from it at dawn. Amenhotep was succeeded by his son Amenhotep IV. He was only a child at his father's death, and his mother, Thyi, took over the control of the state. Her own ideas of religion may have influenced her son; though she was too wise actually to break with the powerful priests of Amen, it is certain she worshipped Aton or the one God.

Amenhotep IV. (Akhnaton) stands out as a most significant individual in human hist. This boy, so delicate and probably an epileptic, was a monotheist, and taught this religion to his people. He was an idealist, and the new religion swept away the anct. superstitions and the great multitude of gods with their ceremonies and traditions; in their place he preached simplicity, honesty, and purity, a code of morality hardly exceeded by the later teaching of Christianity. His god was not a person, he was an essence, the source of life and eternal love. In the face of the anct. traditions of E. and in a land which was utterly priest-ridden, this boy-king set up his beautiful faith. He called it 'The heat-which-is-in-Aton,' and symbolised it by the sun, the giver of joy and energy. He changed his name from Amenhotep to Akhnaton, so that the word Amen might not be connected with it. He married only one wife and strove to teach his people the sanctity of marriage. He built the city of Tel-el-Amarna purely for the worship of Aton. Egyptian art now underwent a great change; Akhnaton wished to be represented really and not conventionally, and his monumental pictures are utterly different in style from the previous Egyptian art. On the death of his mother he broke finally with the powerful priesthood of Amen, and retired to Khatoon or Tel-el-Amarna. Here he developed his creed, and lived entirely in a world of ideals and dreams. One of the hymns he wrote to Aton is of exceeding beauty, and is strangely similar to Psalm civ. (see A. E. P. Weigall, *The Life and Times of Akhnaton*, 1910). The king having practically retired from his kingdom, the inevitable happened. Whilst he was preaching love and peace, red war knocked at the outposts of his empire; in vain his governors sent for help, one by one the hard won victories of his fathers were forgotten, and enemies and plunderers began to show themselves unafraid. Thus the empire of E., greatest in the world during his father's reign, crumbled to pieces, while he dreamed in Tel-el-Amarna. Syria

revolted and intrigued with the advancing Hittites. He had no son to succeed him, and he died at the early age of thirty-five. The kings who followed him were of slight importance until Hor-em-heb became the Pharaoh. Mention should, however, be made of Tut-ankh-Amen, son-in-law of Akhnaton, whom he had assisted in his religious reforms. His reign, c. B.C. 1358-c. 1350, appears to have lasted only from 5 to 9 years. His is among the best known names in Egyptian antiquity from the important discoveries in his tomb. Little is actually known of his life. He re-estab. Thebes as his cap. and, it is said, formally restored its old religion. He was buried in the valley of the kings at Thebes. Hor-em-heb was a practical soldier and a worshipper of Amen. Akhnaton was regarded as a criminal heretic by him, and wherever the name Aton occurred it was effaced. When Akhnaton's mummy was discovered it was found that his name had been erased from both coffin and wrappings; since it was nameless, the priests of Amen felt satisfied, because to the Egyptian the nameless soul was homeless and a wandering shadow without rest throughout eternity.

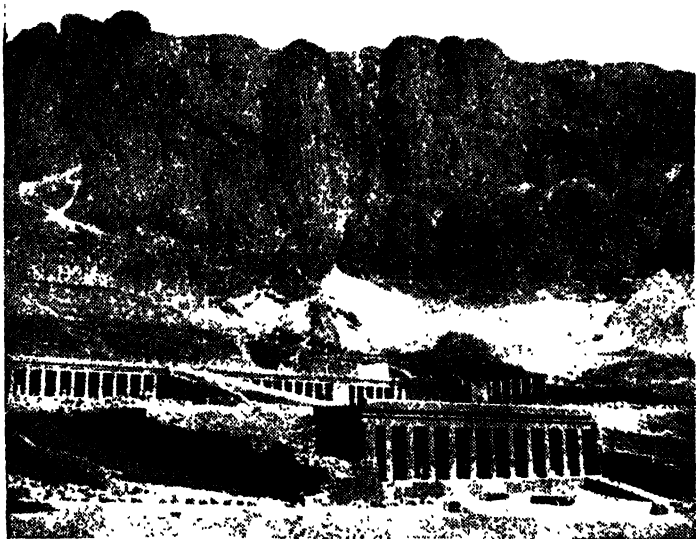
One of the most interesting discoveries of this reign are the tablets of Tel-el-Amarna; they were found in the city ruins; they are nearly all written in Semitic dialect and in the cuneiform character. They consist chiefly of letters from Amenhotep to various royal persons and from foreign kings to Thyi and Amenhotep, and are of the greatest value and interest for the hist. of Palestine and N. Syria at this period. Rameses I. was the founder of the Nineteenth Dynasty, he was probably a distant relation to Hor-em-heb; his two years were spent in severe fighting. His son, Seti I., succeeded him. Seti was a soldier; and his campaigns against Palestine, Syria, Libya, and the Sudan were successful, and he returned home laden with spoils. He continued the building of temples, and added seventy-nine columns to the hall of columns at Karnak. He reopened the copper mines of Sinai, and built many good roads. He commenced a beautiful temple at Abydos, but died before it was finished.

He was succeeded by Rameses II., the Sesostris of the Gks., who had been associated with his father on the throne for some years. He is frequently called 'the Great,' but he must rank below his father in the eyes of hist. He was a vigorous and able king, but possessed of the most amazing vanity and ambition. His pride, his cruelty, and his appalling extravagance sapped the strength of E. The various wars undertaken by Rameses were successful, and the commemoration of his victories was lavishly carved on every temple. The Kheta (Hittites), whose ever-increasing power was a menace to the empire, were not conquered by him, but a treaty was arranged by which each country was sworn not to molest the other's ter. Rameses built the rock-hewn temple of Abu-Simbel, the temple of Bet-el-Wall, and the Ramesseum at Thebes, with many others. All over the

land his name is found carved in many buildings that he did not build, for he placed his name on these that the people to come might believe he was the greatest king of E. His harem was enormous, and he was the father of nearly a hundred sons and fifty-nine daughters. He lived to a great age, and his long oppressive rule left E. impoverished and suffering from an incurable decline. The gathering hosts of the enemy waited at the gates. E. never again took her place as the strongest nation. Mer-en-Ptah, the thirteenth son, succeeded him; the eldest son

the country fell into a state of anarchy, and the kings following were of little importance.

The founder of the Twentieth Dynasty was **Rameses III.** His father Setenhot appears to have driven a Syrian invader from the throne and restored the monarchy. **Rameses** once more estab. a certain amount of order, and drove out his enemies. His greatest victory was over the confederation of people from Cyprus, Crete, Philistia, and the N. shores of the Mediterranean combined with the Libyans. They divided their forces and



D. McLesh

THE GREAT TEMPLE OF DIER-EL-BAHRI IN THE VALLEY OF THE TOMBS
OF THE KINGS AT THEBES

died before his father; this prince, called **Kha-em-uast**, was reported to be a magician and filled with learning. **Mer-en-Ptah** is supposed to be the Pharaoh of the Exodus. He was nearly sixty when he came to the throne. Among the records of his victories is a reference to the conquest of the Israelites in Palestine, proving that there were people of that name already living in Palestine. His reign was full of wars against the encroaching enemies. The Libyan war, in which he was victorious, once more saved E. from being overwhelmed. He appears to have been an excellent general, though an old man at the time of his victories. His mummy was discovered in the tomb of **Amenhotep II.**, and when unrolled showed the placid face of a stout old man with the high-bred aristocratic features of his fathers. After his death comes a period of misery and trouble;

attacked E. by land and sea. **Rameses**, however, outwitted them, and won the famous naval battle near Pelusium and overthrew the land league with much slaughter. This king was evidently a man of some ability; his life-work was to restore the prosperity of his country. He kept two large fleets for trading purposes, one in the Red Sea and one in the Mediterranean, and greatly increased the declining commerce of E. After his death several kings followed of small importance, all named **Rameses**. The last, **Rameses XII.**, was utterly priest-ridden, and the country had become poor and oppressed. On his death **Her-Hor**, the high priest of Amun, seized the throne and probably murdered the young prince, **Rameses**, a lad of great promise, who is heard of no more; so pathetically ends the long line of kings begun some two centuries before. After the accession of **Her-Hor**, E. became

divided, with two kings ruling at the same time, one in Upper and one in Lower E.; great confusion followed, and not until the founder of the Twenty-second Dynasty came to the throne was there any king of importance. He was Shashanq I., the Shishak of the Book of Kings; he invaded Palestine and sacked Jerusalem. He filled all the chief posts in the gov. with members of the royal family, so that presently E. became a land of petty kings. In the reign of Shashanq III., Plankhl, the king of N. Sudan, invaded E. and conquered her. The Twenty-fourth Dynasty from Sais contains the King Bakenrenef, the Bocchoris of the Gks.; he was supposed to be a great law-giver. Shabaka, the Ethiopian, who succeeded him, is said to have defeated Bakenrenef and burnt him alive, an appalling crime in the eyes of the Egyptians. At the end of this Ethiopian dynasty, Thebes was sacked by the Assyrians. Psamthek (or Psammetichus) I. from Sais is the first king of the Twenty-sixth Dynasty; he restored Thebes and estab. some order. Nekau, who succeeded him, led an army against Syria, and on the way slew Josiah, King of Judah, but was defeated by Nebuchadnezzar II. His son Psamthek II. found time during his short reign to repair the temples. His son, Haa-ab-Ra, the Pharaoh Hophra of the Bible and the Apries of the Gks., succeeded him on the throne. This king made an expedition to Syria purposing to assist Zedekiah, King of Judah, but failed to arrive in time, and Jerusalem fell into the hands of Nebuchadnezzar II. The remnant of the people who escaped fled to E. carrying Jeremiah, the prophet, with them. Haa-ab-Ra was dethroned by his own people, and Aahmes, or Anusis II., who was a general in the army, became king. Haa-ab-Ra was slain by an arrow while watching a fight from his galley, though some say he was strangled by order of Aahmes. The son of Aahmes was Psamthek III., who reigned only six months.

The Persian king, Cambyses, now invaded E. and conquered her. Tradition says that Psamthek was forced by Cambyses to drink bullock's blood in sight of the people so that he died, in any case he was almost certainly murdered, and E. became a Persian prov. This closes the hist. of the Pharaohs; the fate of the once glorious land of E. now lay in the hands of the half-insane and wholly cruel king of Persia, who heaped misery and insults on his victims. From the various legends and records concerning him, the man appears to us only as an inhuman brute. Having married two of his sisters, he took the younger to E. with him and slow her for grieving over the death of her brother, Smerdis, whom he had previously murdered. He desecrated the temples of E., and the Egyptians believed his increasing fits of madness were due to a curse because he wounded the sacred calf 'the Aps.' His successor, Darius I., appears to have been a less oppressive ruler, and more inclined to conciliate the native pop. He encouraged the Egyptian priesthood, restored their temples and built fresh ones.

The full titles of the Pharaohs were adopted by him and his successors, but the hatred smouldering in the heart of the Egyptians for E.'s conquerors could not appreciate these things. The country now was not strong enough to combine in a national revolt. In 486 B.C. they rose against Xerxes, who speedily crushed the rebellion. Later on Amyrtaeus of Sais revolted successfully against Darius II., and for perhaps sixty years E. was once more independent. Nectanebus II. was the last native king of E. Artaxerxes III., or Ochus, the Persian, subdued E. finally with great brutality. Her condition now became so miserable that Alexander the Great was welcomed as a deliverer.

After the victory of Issus, Alexander travelled to Memphis and from there marched to the oasis of Siwa to worship at the oracle of Jupiter Ammon. He also founded the port of Alexandria. In the div. of his conquests, E. fell to the share of one of his generals, Ptolemy, son of Lagos, who founded the Ptolemaic Dynasty. Under the rule of the Ptolemies, in spite of heavy taxation, E. once more prospered. Ptolemy I., or Soter I., commenced the famous library and museum at Alexandria. He wrote a hist. of Alexander's campaigns, and he introduced the worship of Serapis. Ptolemy II., Philadelphus, built the lighthouse at Alexandria known as Pharos, regarded as one of the seven wonders of the world. The splendour of his court was famous. Manetho the priest wrote his hist. of E. during this reign. Ptolemy III., Evergetes II., left more monuments than his fathers, among them the temple of Edfu, finished by Ptolemy IX. Ptolemy IV. was merely a debauchee, and the decline of the Ptolemaic kingdom began during his misrule. In the reign of Ptolemy V., who came to the throne at five years old, E. suffered from a series of incompetent regents. When the child grew to manhood his chief pleasure seemed to be athletic games and hunting. During his reign the suppression of native rebellions was remarkable for their cruelty and tyranny. While Ptolemy V. was quite a child, the chief priests met in council at Memphis and passed a decree ordering that special honours be paid to this king. This decree was duly carried out and inscribed on stone steles. The Rosetta stone, now in the Brit. Museum, which was dug up by M. Boussard in 1798, is one of these steles. Its name is derived from the place where it was found. It is of especial interest and value, because it was inscribed in hieroglyphic, demotic, and Gk., and consequently helped materially to decipher the hieroglyphics. Ptolemy VI., Philometer, reigned jointly with his brother Ptolemy VII., Euergetes II., nicknamed Physkon. The infant son of Philometer, Ptolemy VIII., was murdered, and Ptolemy IX., his uncle and murderer, seized the throne and married the mother of the little king. Ptolemy IX. was a man utterly vile in his habits and in himself. During his reign he finished the temple of Edfu and repaired many other temples both in E. and Nubia. Ptolemy X. was

murdered by the people, and an illegitimate son of Soter II. was chosen as Ptolemy XI.; he was called Auletes, the flute-player. Rome supported this man, and after he was driven out by popular hatred, restored him. On his death he left the kingdom to his eldest son, aged ten, Ptolemy Dionysus, who was married to his sister Cleopatra, when she was barely seventeen years old.

These two children ruled jointly under the care of the Roman Senate. The great Pompey was appointed their guardian. Pompey was murdered off Pelusium by order of the boy-king, who had succeeded in banishing his beautiful and troublesome sister. Cleopatra had withdrawn to Syria to make preparations to recover her rights by force; thence she went to Rome and met Julius Caesar. One legend asserts that at her command she was wrapt up in a bundle of rugs and skins and sent as a present to Caesar; her singular beauty and charm overcame his scruples and he resolved to place her on the throne of E. It is certain that he undertook the war for the purpose of reinstating her. In 48 B.C. he landed in E., having defeated Ptolemy, who perished in the naval battle off Alexandria. Cleopatra was replaced on the throne to rule with her younger brother, Ptolemy XIII.; the child died soon afterwards; tradition says he was poisoned by Cleopatra's order. She then lived openly as Caesar's mistress, but after his assassination she went no more to Rome, and her son, whom she asserted to be Caesar's child, called Caesarion, was associated with her on the throne as Ptolemy XIV. The Rom. triumvir, Mark Antony (q.v.), succeeded Caesar in her affections; the story of their love is well known; it was the ruin of both Antony and E. When Octavianus sailed to E. he murdered the little Ptolemy XIV., Mark Antony died by his own hand, and Cleopatra, knowing her kingdom lost, and refusing to become a Rom. captive, died, according to tradition, by applying an asp to her breast. Thus ended the reign of the Ptolemies, and E. now became a Rom. prov. The Ptolemies left many beautiful monuments behind them, among them those on the is. of Philæ. The last native king of E., Nectanebus, built a temple to Isis there, which Philadelphiaus reconstructed. The unfinished kiosk, known as 'Pharaoh's bed,' is one of the most beautiful ruins on the is.; the temple of Ptolemy (Euergetes I.) is also famous for its beauty. As a Rom. prov., 30 B.C., E. was under the rule of a prefect. The first was Cornelius Gallus; he appears to have made a treaty with the Queen of Nubia at Philæ. This queen, Amentaret or Candace, broke the treaty five years later, marched from her city of Meroë and invaded E. The Romans defeated her and marched to Napata, which they sacked, and Candace was forced to retire and submit. During the reign of Claudius the valuable Indian trade was secured for E. Most of the Rom. emperors from Tiberius onwards adopted Egyptian names and titles in E. Hadrian twice visited E., and

founded Antinoë. Greco-Rom. buildings of this period are numerous. Under Marcus Aurelius the suppression of a serious rebellion caused lasting damage to the prosperity of the country. One Rom. general called Avidius Cassius struggled to make himself Emperor of E., but he was slain by his own troops.

When Christianity first began in E. is not quite certain, but probably very early; many Egyptians adopted it as the hope of a future life coincided with their own views. It must always be remembered that the Egyptians thought more of the future life than the present, and that from the earliest times they were a deeply religious race; it was obvious therefore that having adopted Christianity they would do so thoroughly, and under Severus they suffered severe persecutions which merely added to their zeal, and they soon made Alexandria a centre of Christian learning. During the rule of Caracalla (A.D. 211) all the men who could possibly bear arms as soldiers were massacred in Alexandria, because of some real or fancied insult to Caracalla. Under the rule of Decius the Christians again suffered terrible persecutions. In A.D. 270 Zenobia, the famous Queen of Palmyra, invaded E., and Athenodorus, her son, governed E. jointly during the reign of Claudius. When Aurelian became emperor he perceived the dangerous policy of the Palmyrene queen, as her son was already having coins struck bearing the imperial title. Aurelian drove the Palmyrenes from E. His army was led by Probus, and E. was ruled by Rome again. Probus became governor of E., and under his rule repelled the tribes of Blemmyes who came from the E. Sudan and who were dominating the whole of the Thebaid. Under Diocletian the country was still troubled by them, and a formidable revolt broke out led by Achilleus, who called himself the Emperor Domitianus. Diocletian came to E. and captured Alexandria, and Achilleus was slain. The Blemmyes retired to the Sudan, and an arrangement was made to pay them a fixed annual sum on the understanding that they ceased from raiding Rom. ter. A temple was built at Elephantine where both sides swore to observe this covenant. 'Pompey's Pillar' was erected during Diocletian's rule to commemorate part of the corn tribute being paid to the Alexandrians. The Christians at this period were again persecuted with savage cruelty and they fled to the deserts in large numbers, building and hiding in obscure monasteries. In 378 Theodosius the Great proclaimed Christianity to be the religion of his empire. E. at once turned her attention to converting the temples of the anc. gods of her country into churches. The temple of Serapis at this time was the scene of a bloody conflict between the Christian mob and the remnants of the pagans; finally it was converted into a church for the use of the Christians. This was the real death-blow to Paganism; the Christians showed as little mercy as the pagans in asserting the supremacy

of their belief. During the reign of Justinian, while the army was occupied in quelling an invasion of the Blommies, Chosroes, the Persian, invaded E. and easily conquered her, holding her for ten years. Heraclius defeated the Persian and won back the country for a little while, but one stronger than he was rapidly gathering forces on her borders to take and possess her finally. E., weakened by her long internal struggles and utterly impoverished by the years of misrule, now fell an easy prey to Amr-Ibn-al-Asi, the general of the Khalifa Omar, and the once great E. became a prov. of the newly-founded Arab empire. See below, *Moslem Conquest*.

Religion and Antiquities.—The anct. religion of the early Egyptians is exceedingly difficult to disentangle or explain. The multitude of tribal gods and the enormous number of various legends and beliefs belonging to each separate god of one dist. makes it impossible, except at great length, to show how all were subject to and fulfilled their various functions under the one supreme head. The names of many gods and goddesses have been lost, but a total of about 2200 have been discovered. The Egyptian never had any real uniformity of religion, but always the chief god reigned supreme, the others merely fulfilling their allotted parts. We cannot, with absolute truth, describe their anct. religion as monotheistic, but the one supreme being was their real and *only* God, and the multitude of others were but attendants and symbols.

The most familiar gods from the anct. records are first Thoth, who was the heart of Nu, Nu being a god who floated in vast waters and Thoth the heart or idea of Nu who created the universe. The sun, Ra, sprang into being from the endless waste of waters and thereafter ruled the heavens. Osiris (whose name must not be spoken) and Isis, his beloved sister and wife, were the children of Ra, also Set, the wicked one, and Nephthys, his wife and sister. The legends of Osiris and the cult of that same god are as old as dynastic E. (probably older). Osiris was the good god-man who for love of this world, suffered, died, and rose again to rule in Heaven. He was to the Egyptian the proof of the resurrection, and their great hope of eternal life. The description of his kingdom, 'The fields of peace, the pleasant pools of peace,' prove how readily acceptable such a creed was to the hard-worked Egyptian who lived in abject poverty, depending entirely on the Nile for his hard-won crops. Isis, the most famous goddess of E., the wife and sister of Osiris, had many beautiful legends attached to her name. One of the stories of her love for Osiris and the finding of his body may be briefly told: Set, the wicked one, the god of evil, killed Osiris and divided his body into fourteen pieces; Isis wandered over the earth until all the parts of her husband's body were found. During her wanderings, Horus, her divine son, was born. The holy child, under the instructions of his devoted mother, performed certain ceremonies

at his father's burial, and assisted in raising him from the dead; from that time Osiris became the king of Amenti, the under-world, the land of hopes and dreams. The worship of the gentle mother Isis increased gradually, spreading at last to Rome and Greece. She became the goddess of the under-world of love, of magic, and of healing. As the goddess of magic, a legend of the new kingdom describes how she discovered the hidden, all-powerful name of Ra, which no one knew (names always bore a large part in Egyptian ceremonies). To the Egyptian she was always the great gentleness, the pure in heart, and the devoted wife and mother. Her worship withstood longer than any other the overwhelming tide of Christianity and there is much in common between the Isis-Osiris legend and the doctrine of the Incarnation. Thoth was usually represented as the scribe of the gods; he it was who weighed the hearts of the dead in the court of Osiris; by his side always waited a half-animal monster known as Am-mit, the eater of the dead, patiently waiting to devour the heart that would not balance against the feather. Among the other better-known gods and goddesses are Ptah of Memphis, who assisted in the creation, the Hephestus of the Gks.; Maat, the goddess of truth; Hathor, the lovable, represented with a headdress of the horns of a cow and the solar disc between them; the old god Bes of the Sudan; Hapi, the Nile god; Anubis, the jackal god, son of Set; Nut, the goddess of the sky; Bast, the goddess of Bubastis, to whom cats were sacred; and many others.

Later, many foreign gods crept in and were either worshipped separately or associated with the gods of E.; such were Iap, the Apis Bull, and Serapis, and the great god Ammon or Amen of Thebes, who became associated with Ra of Memphis as Amen-Ra. Amen-Ra became a very powerful god; his worship reached its zenith during the Eighteenth Dynasty. The priesthood of Thebes associated Ra-Harmachis of Memphis with him because they desired to absorb all the lesser gods. Amenhotep IV., or Akhnaton, who formed his own creed apart from all previous Egyptian teachings, was as a child dedicated to Ra of Memphis; thus at the beginning of his new religion his god Aton was associated with Ra. Aton has been identified with the Syrian-Asiatic Adonis (*cf.* Hebrew *adonai*, Lord!). The worship of Serapis was introduced by Ptolemy Soter I., Serapis being identified with Userhapi the Osiris-Apis. A Gk. statue of this god was placed in the Serapeum of Alexandria, the destruction of which by the Christians has already been referred to. The dead Apis, or sacred bull, was embalmed and buried at Memphis. Sacred amulets were popular with the Egyptians, and were supposed to possess magical properties. The best known are the *scarab* or beetle, symbol of the god Khepera, who was one of the creators; the *girdle* of Isis, symbol of protection; the *ankh*, symbol of life; the *shen*, or circle, which became the car-

touché of the kings, meaning protection from Ra; and many others. Sacred figures were used to bury with the dead, known as *Ushabti* figures; these were supposed to come to life in the other world and perform all the hard work for the person who was buried with them. The god Thoth, who was the scribe of the other world, was said to have invented writing. Hieroglyphics were used until the Rom. period, when demotic writing took their place.

The hieroglyphics were purely pictorial; they were used for monumental purposes, but for ordinary use on papyrus the hieratic writing soon came into use. The key to their decipherment, the Rossetta stone, has been referred to above. Writing materials consisted of papyrus, a reed-pen, and ink. The papyrus used was the stem of the plant which grew in the marshes by the Nile: the strips of the stem were arranged in a sheet perpendicularly and another sheet placed horizontally, the two sheets being then gummed together and dried. The Coptic writing consisted of the Ok. alphabet and sev. signs. Of the large amount of literature which has been saved, the largest part is religious. 'The Book of the coming forth by Day,' or 'The Book of the Dead,' is a series of formulas collected by the priests of Heliopolis about 3200 B.C. 'The Book of Breathings' contains a number of prayers. Others are 'The Book of the Lamentations of Isis and Nephthys,' and 'The Book of Traversing Eternity,' an account of a journey through the other world. There are many other curious and interesting books of litanies, hymns, and prayers, etc. Some of the hymns are very fine. Among the literature not religious may be mentioned the 'Precepts of Ptah-hotep,' 'The Instructions of Amen-em-hat I.,' 'The maxims of Ani,' and a 'Hymn to the praise of Learning.' There are many stories of marvellous adventure, and some interesting scientific works on astronomy and geometry. The Turin Papyrus is a chronological list of 300 kings, with the length of their reigns; the tablets of Abydos were lists made for Seti I. There are various medical works of great interest, but although learned physicians existed, magic was mixed up with medicine and probably believed in more than drugs. A good deal of poetry must have been written; many songs and verses have been saved, among them the love-songs from the Harris Papyrus. The manners and customs of anc. E. are exceedingly interesting. Women enjoyed great freedom; unlike the women of other Eastern countries they went unveiled, and met men friends on equal terms. The legal wife passed in and out of the house as she chose, and when she became a mother her influence greatly increased. The descent of a house was traced through the mother, not the father. Brothers were allowed to marry sisters, and uncles their nieces. Kings and nobles were allowed sev. wives and concubines, but only one was the legal mistress of the house, whom it was almost impossible to divorce; all the wives were free and respected and appear to have

lived happily together without jealousy. The poorer class women worked very hard, and being married frequently at fourteen and fifteen and often having large families they naturally aged very rapidly, but all enjoyed common rights and freedom and held a much better position than the other E. countries gave to their women. The children had many toys; sev. have lasted to our own day, such as dolls, balls, animals with movable limbs, ninopins, and many others.

A certain amount of education was given at various schools, and colleges for the students of magic and religion existed, learning being always held in high repute. The people ate their meals with their fingers and used the flat bread-cakes to wipe them on. Beer was the common drink of the country and made in sev. ways; date-wine was also largely drunk. Dancing men and women were popular and greatly amused the people, also tumblers and contortionists. The harp, the drum, and the sistrum were favourite musical instruments. The furniture of royal and noble houses was very rich and beautiful, inlaid ebony and ivory being much used. From the earliest time the Egyptian was an excellent potter. Vessels of a great variety of shape and size were always in use. The making of glass was an anc. art in which the workers excelled; porcelain was much used, and many beautiful coloured vases, figures, beads, etc., have been discovered; the colouring of their porcelain was often exceedingly vivid and lovely: the beautiful rich turquoise blue, with which most people are familiar, and brilliant greens and purples delighted them. Jewellers excelled in their art at a very early date; some extremely early specimens of exquisite design have been discovered, such as the gold bracelet of the wife of a king of the First Dynasty. Both sexes wore a quantity of jewellery and frequently carried fans and mirrors. Their currency appears to have been ring money of gold and copper, and later of iron, also bags of gold dust, representing a certain fixed value. A distinct class of the people were employed as embalmers of the dead, who had certain restrictions and privileges. For the methods of embalming, see MUMMY. The weaving of fine linen was always a flourishing trade; apparently each temple possessed its staff of linen weavers.

The clothes worn by the Egyptians were very simple for a long period; a loin cloth and a belt for the men and a short tight petticoat for the women, made of linen, wool being unclean. The children went naked, both rich and poor. Later the men wore a skirt reaching to the knees, with a curious triangular front which stood out as though starched. The women's skirts became longer and were held up by braces over the shoulders, leaving the upper part of the body bare. The people of the Eighteenth Dynasty wore more elaborate clothes; cloaks and tunics became fashionable with fringes and embroideries. Sandals were made for the feet and elaborate wigs for the

heads. The men all shaved their heads, the young boys retaining a long plaited lock on the side of the head until they came to manhood. The women plaited up their own hair with strings of beads, and wore decorated bangles.

Moslem Conquest.—In A.D. 639 Omar I., the second Caliph, sent an army of 4000 men, under the command of Amr, to take E. They marched through Syria to Pelusium, which fell easily, then on to the Fayum, and defeated the Romans at Heliopolis, A.D. 640. It is probable that Cyrus, the governor of E., may, for reasons of his own, have assisted in betraying the country to the Moslems. It is certain the Copts helped the enemy, and E. was conquered with very little difficulty. The pagan pop. embraced the faith of Islam,

obtaining the throne of E.: many of them were murdered, and the struggles of different persons to obtain power, together with heavy taxation, reduced the country to an utterly wretched condition. In 1164 the Franks invaded E. and joined a usurper called Shawar; they were defeated by Shirguh and his nephew, the famous Saladin (q.v.). Saladin took the title of Sultan, and during his rule E. recovered a little. His son Othman succeeded him, and another period of disputes and disasters convulsed the country. The Mameluke Dynasty began after the death of the Sultan Nagm-al-din, who had purchased vast numbers of slaves and turned them into soldiers; these were called the Bari Mamelukes. In 1515 war began with Selim I., the Ottoman Sultan,



W. McLeish

THE AVENUE OF SPHINXES AT THE ENTRANCE OF THE TEMPLE OF KARNAK

but the Copts remained Christians. The Arabic language rapidly spread and gradually superseded Egyptian. Now began a hist. of bloodshed, cruelty, tyranny and treachery that it would be difficult to exceed. For about the first 100 years the Christians were tolerated, and then a series of terrible persecutions commenced. Heavy taxation began and steadily increased. A series of ineffectual revolts occurred, but the unhappy people had suffered so long that they were utterly incapable of a properly organised struggle for freedom, and their futile efforts were instantly crushed with great cruelty. In 832 the Copts raised a more serious revolt, and Motasin, the feudal lord, failed to suppress them with an army of 4000 Turks. The Caliph Mamun came to E. to assist and the Copts were defeated. All the men who were caught were massacred horribly and the women and children sold as slaves. This finally subdued the Coptic nation. In A.D. 868 E. was given in fief to a Turkish general called Bayikbeg, the son of a slave, who had risen in the Caliph's service: from this time onwards various Arabs, Turks, and Syrians succeeded in

who defeated the Mamelukes and incorporated E. with the Ottoman empire: the country then became a Turkish prov.

Modern History.—From this time until the Fr. expedition in 1798, the gov. suffered constant changes; sev. rulers were murdered, with continual bloodshed, cruelty, and internal revolts. The Fr. expedition was presumably to suppress the Mamelukes and restore the authority of the Sublime Porte, but it was the beginning of that dream of Oriental conquest that always possessed Napoleon. Napoleon landed, and, after taking Alexandria, defeated the army of Murad Bey and Ibrahim Bey at the battle of the Pyramids. He then estab. a municipal council at Cairo, and the Fr. exercised dictatorial power. The Fr. fleet was destroyed by Nelson and the Eng. in the great battle of the Nile in 1798. Napoleon went off on an expedition to Syria, leaving Fr. governors at Cairo, Alexandria, and Upper E. The Sublime Porte sent a double expedition to recover E. by force. The Fr. general, Kléber, defeated the Turks, and a certain amount of order was restored. Kléber was assassinated, and

Gen. (Baron) de Menou succeeded in command. His declaration of a Fr. protectorate over E. convulsed the country again. In 1801 the Eng., commanded by Sir Ralph Abercromby, landed at Aboukir and invested Alexandria. Gen. de Menou attacked them, but he was defeated. Sir Ralph Abercromby died from his wounds received in the battle. The combined Brit. and Turkish armies under Gen. J. Hely Hutchinson and Yusuf Pasha marched to Cairo, and the Fr. general, Bellard, finding himself overwhelmed, agreed to evacuate Cairo and leave E. with his troops. General de Menou at Alexandria was compelled to accept the same conditions, and both left for France, thus terminating the Fr. occupation of E. Troubles arose almost at once. The Turks treacherously tried to exterminate the Mamelukes. Gen. Hely Hutchinson took measures at once against the Turks, who submitted and gave up their prisoners. Mohammed Khosrev was the first Turkish governor after the Fr. occupation. The Turks and Mamelukes continued to fight, and the Albanian soldiers rebelled against the Turks successfully, and Mahommed Khosrev fled. Tahir Pasha, the leader of the Albanians, seized the gov., but was assassinated twenty-three days afterwards. Mehmet Ali, an Albanian commander, allied himself to the Mamelukes; this was the beginning of further terrible struggles; one faction of the Albanians placed Ahmed Pasha Khorshid in the seat of gov. His rule was abominable and the half-starved and ruined people of Cairo waited in misery for a deliverer. Three thousand Kurdish troops were sent from Syria to Cairo to strengthen Khorshid, but they behaved with such brutal ferocity that Mehmet Ali returned, and was hailed by the people as their leader and saviour. A furious and bloody struggle took place between the forces of the two Pashas. Khorshid was recalled to Turkey, and Mehmet Ali made himself governor of E. The Beys (Mamelukes) disputed his authority; Mehmet Ali arranged and carried out successfully a treacherous and horrible massacre of the Mamelukes. In 1807 a Brit. force arrived under the command of Gen. Mackenzie Fraser. The troops entered Rosetta without opposition, but were trapped in the narrow streets, every roof and window rained fire on them from the hidden garrison, 185 Eng. were killed and 281 were wounded. A series of disasters followed. Mehmet Ali marched to Cairo, having allied himself to his enemies, the Beys, for the purpose of driving out the Eng. The Eng. were defeated and obliged to retire. Mehmet Ali then proceeded to massacre the remaining Beys, and finally remained the sole undisputed possessor of E. He recognised the suzerainty of the Sultan, and complied with the command of the Porte to send an army against the Wahabis (q.v.). He returned to Cairo on the day of the battle of Waterloo. Mehmet Ali now turned his attention to Egyptian domestic affairs; he created for himself a monopoly of the industries of the country, and by

nationalising the land became the proprietor of all the cultivated soil of E. He started and encouraged the cotton-growing industry in the delta, which was perhaps the best thing he ever did. He ordered the new canal between the Nile and Alexandria to be dug, which was done with forced labour and under such wretched conditions that 20,000 fellahin died before it was completed. The country was still heavily taxed; all the necessities of life were four times the price they formerly had been; the land became utterly impoverished; and the finances were in hopeless chaos. In 1838 a commercial treaty with Turkey was arranged which destroyed the monopolies, and matters grew a shade better. Mehmet Ali reorganised his army, and the fellahin and negroes replaced Turks and Albanians. The sultan appointed him governor of Crete, and in 1821 a fleet of 60 Egyptian vessels sailed to Suda Bay to assist the Sultan against the Gk. insurgents. The European powers intervened and Mehmet Ali withdrew to E. In 1833, the Sultan appointed Mehmet Pasha of Syria and the dist. of Adana, so that Mehmet now became the sole ruler of a large empire, while he was only responsible for a small tribute to the Sultan. In 1841 the powers again intervened; Mehmet was becoming too strong and too aggressive; he was compelled to submit to certain restrictions. He died in 1849 at the age of eighty. This remarkable man had achieved a great deal during his long and stormy career. His list bears the records of many treacherous deeds and violent scenes of bloodshed, but he was, in spite of all, a wonderful, strong, and interesting character. Among the really good things he accomplished for E. was the fostering of the cotton industry in the delta and the conquest of the Sudan.

His son Ibrahim being dead, Abbas I., Mehmet's grandson, ruled. During his reign the railway from Alexandria to Cairo was commenced at the suggestion of the Brit. Gov. Abbas was murdered by his own slaves after only six years' rule. He was succeeded by Said, the fourth son of Mehmet. During his rule Ferdinand de Lesseps obtained the concession (1856) for the construction of the Suez Canal (q.v.). The Eng. secured the right to start the Telegraph Company and establish the Bank of E. The national debt was commenced under Said; he died in 1863. Ismail, who succeeded him, did a great deal to reorganise the gov., and made many improvements, but his extravagance landed him in bankruptcy; he sold his shares in the Suez Canal to the Brit. Gov., thereby paving the way for the international control of the Khedive's affairs. He was compelled to submit to a constitutional ministry, of which he soon found means of getting rid. Ismail was immediately deposed by the Sultan, and his son, Tewfik, succeeded him as Khedive. In 1879 the Eng. and Fr. re-established the constitution; Maj. Sir Evelyn Baring (afterwards Lord Cromer) and M. de Blignières represented the two countries. A movement now began among the Arab

troops to remove the foreigners; it was led by a fellow officer, calling himself Ahmed Arabi. This man was promoted and made under-secretary for war, and then member of the cabinet. Arabi possessed a gift of rough eloquence, which appealed to the people; it is probably that he was sincere at heart but an unconscious tool in stronger and more unscrupulous hands. At the instigation of an Ariatic faction, a massacre took place in Alexandria, 1882, and, fearing a serious revolt, the Brit. and Fr. fleets arrived. The forts were bombarded, but the nationalist movement prepared to resist with great determination. The Brit. Gov. decided to employ military force. The Fr. declined to share the responsibility and England acted alone. Troops were landed under the command of Sir Garnet Wolseley, and the revolt was crushed at the battle of Tel-el-Kebir. The Khedive returned to Cairo, and a fresh ministry was formed. Arabi was sentenced to death, but his life was spared and he was banished. The task of restoring the country to order fell to Lord Dufferin, the high commissioner; he laid down lines for the reorganising of the administrative parts of the gov., and the practical carrying out of this general scheme was undertaken by Sir Evelyn Baring (Lord Cromer), who was appointed consul-general in 1884. The Sudan now claimed the immediate attention of the country. A religious rebellion had broken out led by a fanatic calling himself a Mahdi of Islam. Col. William Hicks Pasha had been sent with 10,000 men to suppress the revolt, but was utterly defeated at the battle of Obeid in 1883. The Khedive wished to make another attempt to regain his lost province, but Sir Evelyn Baring insisted that, there being neither men nor money, the Sudan must wait. The Mahdi was now master of the chief part of the Sudan, though Khartoum and some other places (*q.v.*) still held out. Gen. Vajentine Baker, with an army of 2500 mixed troops, was sent by the Khedive to relieve Sinkat and Tokar; they were defeated with great loss, and Suakin was in grave danger. A Brit. force of 4400 was sent and concentrated at Suakin. Sinkat fell, and Tokar surrendered to the Mahdi. Gen. Gordon and Col. J. D. Stewart, who had been sent by the Brit. gov. to Khartoum to discover the best method of evacuation, were now entirely cut off from help and besieged in Khartoum, and the problem was how to extricate them. There was a long delay, due to various causes. Gen. Gordon was only provisioned for five months; the siege began on March 18, 1884, and held out till Jan. 1885. Sir Charles Wilson, arriving on Jan. 28, found Khartoum in the hands of the enemy and Gen. Gordon murdered two days before. Khartoum had fallen, Gordon was murdered, the relief expedition had come too late. Lord Wolseley's Nile expedition, though failing in its ultimate purpose, experienced some severe fighting, and won the battles of Abu Klea and Metemnah, etc. The Brit. troops were withdrawn in June,

and the Mahdi died before the rearguard had left Dongola.

During this time Sir Evelyn Baring was fighting the internal difficulties of E., the question of finance being the hardest to overcome. The Convention of London (1885) enabled E. to raise a loan of £9,000,000; of this, when the indemnities and debts were paid, £1,000,000 remained over, and this was invested in irrigation and largely helped to save the country from bankruptcy. In 1892 the Khedive Tewfik died, and his son Abbas Hilmi succeeded. He was quite a young man and at first failed to comprehend the need of understanding his position as Khedive under the protection of Britain. He secretly encouraged an anti-Brit. agitation, but at last realising his own danger, he submitted without further trouble. During this time the Khalifa Abdullah-el-Taisha succeeded the Mahdi and ruled the Sudan. His intention was to conquer E., and though delayed at first by trouble with Abyssinia and various massacres of Egyptians, he arranged his campaign and placed Wad-en-Nefum, the Dervish Amir (who had defeated Hicks Pasha), in command of the army that was to conquer E. Another large portion of the army under Osman Digna, once a slave-dealer of Suakin, and now one of the greatest generals under the Khalifa, was engaged in fighting the Abyssinians. Osman Digna was defeated with great slaughter and fled to Kassala. In 1886 Col. Kitchener seized Osman Digna's stronghold and a large store of ammunition; Osman himself escaped. Kitchener became governor of Suakin in the same year and Sirdar of the Egyptian Army in 1890. It was not until 1898 that the power of the Khalifa was broken. The battle of Omdurman marked the destruction of the Khalifa's rule. His army was 40,000 strong. Kitchener marched to Omdurman, driving the enemy back as he went. Among the many deeds of gallantry that occurred must be mentioned the famous charge of the 21st Lancers. They were surprised by 2000 Dervishes but cut their way through with heavy loss. During the battle over 10,000 Dervishes were killed and as many wounded; 5000 were taken prisoner. The black flag of the Khalifa was captured and sent to Queen Victoria. The result of this victory was the extinction of Mahdism and the recovery of the Sudan for E. The Khalifa fled. On the Sirdar's return he encountered the Fr. expedition at Fashoda under Capt. Marchand. Matters were diplomatically arranged, though the crisis became very acute. Capt. Marchand returned to France. The Khalifa was killed in an encounter in 1899, and his son surrendered. Osman Digna was captured at Yebel Warriba in 1900.

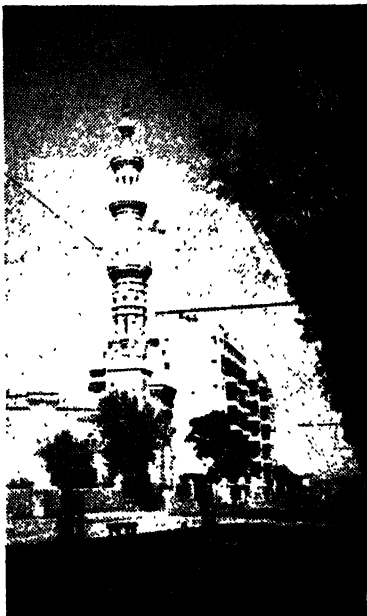
Meanwhile the country of E. continued to increase in prosperity. In 1907 Sir Evelyn Baring (now Lord Cromer) resigned, having completed his great work of creating from the ruins of hopeless misrule and ignorant tyranny a country that was steadily progressing and prospering. Sir Eldon Gorst succeeded him. The

Anglo-Fr. Agreement of 1904 put an end to the foreign complications attendant on the somewhat anomalous position of Great Britain; it recognised the protection and occupation of E. by Great Britain as a *fait accompli*. It was further of inestimable importance in freeing the country from the financial embarrassments imposed on her by the foreign bondholders through the *Caisse de la Dette*, and to this freedom the increasing prosperity of the country must be regarded as mainly due (the *Caisse* still exists, but its duties are now restricted to receiving the revenues necessary for the interest and for the payment of the coupons as they become due, while it also holds a reserve fund of £E1,800,000, the interest on which reduces the amount of the Treasury contribution). Trouble arose with Turkey over a boundary question on the E. frontier in 1906, but this was adjusted, and the Nationalist movement then became the chief cause of political anxiety. This culminated in the murder of Butros Pasha, the Coptic Prime Minister, in 1910, by one Wardani, who, after a long trial, was executed in the following year.

The resignation of Sir Eldon Gorst in 1911 owing to ill-health was followed by the appointment of Lord Kitchener as Brit. agent and *commandant-general*. Kitchener's administration was marked by great personal prestige, and the policy of his predecessor was to a certain extent reversed. The cry of 'Egypt for the Egyptians' was not quite so insistent, and any measure of independence which Egyptian ministers had previously enjoyed was quietly but firmly withdrawn. The Brit. officials were again ensconcing themselves in administrative posts, and strange as it may seem, these actions seemed to pass without demur on the part of the Egyptians. During the years of the Brit. occupation there had been little or no social intercourse between the Egyptians and the members of that vastly different race who were administering and virtually ruling their land for them. Indeed the social barriers had been well defined; but it was part of Kitchener's policy to alter this and to foster social intercourse between the Brit. and the Egyptians. The First World War interrupted Kitchener's activities in E. and on Aug. 6, 1914, he became secretary of state for war. Great Britain declared war on Turkey on Nov. 5. This was followed on Dec. 18 by Great Britain declaring E. to be a Brit. Protectorate. Next day the Khedive was deposed and his uncle, Hussein Kamil, was proclaimed Sultan of E. Sir Henry MacMahon, who had rendered political service in India, but was without experience of E., was made high commissioner. In 1916 Sir Henry MacMahon was succeeded in the high commissionership by Sir R. Wingate, governor of the Sudan and Sirdar. On Oct. 9, 1917, the Sultan Hussein Kamil (or Kamel, *q.v.*) died, and was succeeded by his brother Ahmed Fuad. After his accession (Oct. 30) an armistice between Turkey and the Allies was proclaimed, to be followed on Nov. 11 by the armistice between the

Allies and Germany. (For the campaign in Egypt, see EGYPT, FIRST WORLD WAR CAMPAIGN IN.)

It is not surprising that the wave of self-determination that had risen, as a direct consequence of the First World War, among the smaller races in Europe, was not without its effect on the political situation in E. The Nationalists were becoming extremely restive, and by skilful propaganda were adding daily to their numbers and enhancing the self-assertiveness of their adherents. They were led by Saad Zaglul Pasha, an able man of



E. Buchanan

A STREET IN CAIRO

humble origin and a former minister of education and minister of justice, who within a couple of days from the signing of the Armistice led a deputation to the high commissioner asking that permission might be granted to send an Egyptian delegation to London to discuss Egyptian affairs. The request received the backing of Sir R. Wingate, but was refused in somewhat curt terms by the Foreign Office. A carefully worded reply by Zaglul, in which the request was renewed, was also rejected against the advice of the high commissioner. This refusal determined Zaglul, and early in 1919 he announced the Nationalist programme at a public meeting. This programme demanded no less than complete independence for E. It is difficult to understand

the policy of the Brit. Gov. at this juncture. It had acted against the advice of its own high commissioner, Sir R. Wingate, who on account of the advice he had tendered was recalled. The next stroke was the banishment of Zaglul with three other prominent Nationalists to Malta, and this was the occasion of rioting and strikes. Property was destroyed, Eng. offices were wrecked and a state of general lawlessness prevailed. The Brit. troops were called out, and sev. rioters were shot. The rioting spread, and on March 18 at Deirut a train was attacked, and two Brit. officers, an official and five soldiers were murdered. For these murders about thirty people paid the extreme penalty on April 9. Gen. Allenby (*q.v.*), who had been appointed Special High Commissioner, succeeded in restoring order, and Zaglul and his fellow-exiles were allowed to return to E.

Acting on the recommendation of Gen. Allenby the Brit. gov. proclaimed the end of the Brit. Protectorate, and E. was recognised as an independent sovereign state (Feb. 28, 1922). This proclamation was subsequently ratified by the Brit. Parliament, which reserved the four following points for a later settlement: (1) Security of communications between various parts of the Empire; (2) defence of E. against foreign attack; (3) protection of European interests; (4) the Sudan. The Sultan Ahmed Fuad became King Fuad I. (*q.v.*). On April 19, 1923, the constitution of the kingdom of E. as an hereditary constitutional monarchy was proclaimed. The constitution settled the succession, declared the gov. to be representative and estab. equal legal, civil, and political rights for all Egyptians. Religious and personal liberty is guaranteed, and compulsory free elementary education for both sexes is provided in gov. schools. Islam is declared to be the state religion, and Arabic the official language. Parliament consists of two houses, the Senate and the Chamber of Deputies. The king nominates two-fifths of the members of the Senate, and the remainder are elected by universal suffrage, one senator to every 180,000 inhabs. The king also nominates the President of the Senate. The Chamber of Deputies is elected by universal male suffrage, one member to 60,000 electors. The term is for five years, and each member receives an allowance of £E600 per annum. The first election under the new constitution took place in Nov. 1923, and resulted in a large majority for the Nationalist party. Zaglul became Prime Minister, and the first demands put forward by his party were the complete independence of E., the withdrawal of Brit. troops and the return of the Sudan. On Nov. 19, 1924, Gen. Sir Lee Stack, governor-general of the Sudan, was assassinated by Egyptian Nationalists at Cairo. The Brit. Gov. insisted on the withdrawal of detachments of Egyptian troops from the Sudan. In Oct. 1925 Lord Lloyd was appointed high commissioner by the Baldwin gov. and held office till his recall by the Labour gov. in 1929.

In midsummer 1927 King Fuad visited England and conversations between his Prime Minister, Abd-el-Khalig Sarwat Pasha, and Sir Auston Chamberlain, the Brit. foreign secretary, took place in respect of a draft treaty between the two countries. The main points of the treaty offered by the Brit. gov. as a result of the negotiations were: E. to become a member of the League of Nations; Brit. troops to remain in E. for another ten years, when a fresh agreement would be made; Great Britain to be represented in E. by an ambas. who was to take precedence in the diplomatic corps; the organisation of the Egyptian army and the existing administration of the Sudan to remain unaltered. The treaty was rejected by the Nationalists, to the leadership of whom Mustafa en-Nahhas Pasha had succeeded on the death of Zaglul Pasha on Aug. 28, 1927. The ministry of Sarwat resigned on the rejection of the treaty terms and Mustafa en-Nahhas became Prime Minister. His term of office was brief, the ministry being dismissed on June 24, 1928. Muhammed Mahmud Pasha was appointed Prime Minister three days later, but, on July 19, Parliament was dissolved by royal decree and parl. gov. was suspended. In May 1929 an agreement between Great Britain and E. was concluded in respect of the rights of E. and the Sudan in the waters of the Nile and the regulation of irrigation works. In 1930 another attempt was made by the Brit. (Labour) Gov., with Arthur Henderson as foreign secretary, to settle the outstanding differences between the two countries, but the question of the final settlement of the Sudan proved a stumbling-block, and no treaty was concluded until 1936, the year in which King Fuad died and was succeeded by his son, Farouk I. In Aug. of that year was signed the Anglo-Egyptian Treaty stabilising Anglo-Egyptian relations for the succeeding twenty years, terminating the fifty years' occupation of E. by Brit. forces and making E. a sovereign State bound to Britain by a close alliance. The provisions of this treaty may be summarised as follows: (i) aid in war-time—in the event of either the United Kingdom or E. becoming involved in war, the non-combatant nation was pledged to give aid as an ally. Egyptian aid to the United Kingdom included the use of such Egyptian ports, aerodromes and means of communication as might be required by the Brit. forces. Three years later, when the Second World War broke out E. loyally fulfilled this obligation, as was shown by the disembarkation at Alexandria of the Australian and New Zealand Expeditionary force in the early part of 1940; (ii) The Suez Canal—Brit. troops to be stationed in the vicinity of the Canal, in a specific zone, to ensure, with Egyptian co-operation, the defence of the Canal. Not more than 10,000 Brit. troops or more than 400 R.A.F. pilots to be maintained in the Canal zone (actually an increase on the former numbers). The passage of aircraft over the Canal and within 20 km. of it was (except for Brit. and Egyptian machines) forbidden. At the expiry of 20 years the

question whether the Egyptian Army was strong enough to ensure the security of navigation of the Canal, thereby rendering the presence of Brit. forces no longer necessary, might be submitted to the Council of the League of Nations. (iii) Military and aerial facilities to be accorded to Britain including the maintenance of adequate landing-grounds and seaplane anchorages in Egyptian ters. and waters. (iv) The Sudan—The Brit. governor-general to continue to exercise his powers on the joint behalf of E. and the United Kingdom. Appointments of officials in the Sudan to remain vested in the governor-general. In addition to Sudanese troops, both Brit. and Egyptian troops to be stationed in the Sudan for its defence. Egyptian immigration into the Sudan to be unrestricted and no discrimination to be made between Brit. and Egyptian nationals in commercial or proprietary matters. (v.) Capitulations—abolition of this regime to be undertaken as soon as possible, the United Kingdom recognising that the responsibility for the lives and property of foreigners in E. devolves upon the Egyptian gov. To effect this change, a transitional regime for a reasonable period would be fixed, during which the mixed tribunals would remain and would, in addition to their existing judicial functions, exercise the jurisdiction vested in the consular courts. With the coming into force of the Montreux Convention in Oct. 1937, the regime of capitulations was definitely abolished. The treaty was ratified by the Egyptian Chamber by an overwhelming majority (202 votes to 11) and by the Senate by 109 votes to 7. In 1938 the Egyptian Council of Defence decided to create an Egyptian Navy. As a nucleus a fleet of 36 ships was to be built, comprising cruisers, minelayers, minesweepers, and submarines.

During the war Germany and Italy made every effort to persuade E. to betray Britain. A small but influential body of opinion in E. was greatly attracted by this political bait, but E. as a whole stood firm by her obligations. But an acute crisis arose in Feb. 1942, Hussein Sirry Pasha, the Premier, and a good friend of Britain, had no following in the country and was powerless to suppress a strong clique of intriguers who were stirring up anti-Brit. feeling. King Farouk then called in Mustapha el Nahas Pasha, leader of the Wafd and with the Wafd in office the situation changed overnight. In the succeeding elections the Wafd secured 250 seats in a chamber of 264. Nahas's first step was categorically to declare his determination to carry out the terms of the treaty. In the negotiation of which he himself had been the country's leader in letter and spirit. The country now drew inspiration from its new-found unity and responded with a will to its leader's example. This sentiment was vitally necessary a few months later. Until the end of June 1942 there had been no definite threat to E. proper, although in 1940 the forces of Marshal Graziani had reached Sidi Barrani. But at the begin-

ning of July 1942, Gen. Rommel's forces were actually marching on the Nile Delta, and for some days the military position was precarious. In such a situation an E. hostile to Britain would vastly have increased the danger from Rommel's Afrika Korps. E. was the base of the famous Eighth Army (q.v.) through which the Army's supplies and reinforcements had to come, where its headquarters were estab., which provided its ports and communications, through which came tanks from America, and which was, in fact, a *sine qua non* of its existence as a fighting force (for the issue of the campaigns in Egypt and Cyrenaica see under AFRICA, NORTH, SECOND WORLD WAR CAMPAIGNS IX). Rarely can any international undertaking have paid such solid dividends as the Anglo-Egyptian Treaty. Had there been no treaty, had not Anglo-Egyptian relations been so regularised, E. could not but have taken advantage of Britain's preoccupations to further her own interests. On the other hand, a treaty which demanded more of E. than it in fact did might well have defeated its own ends. Criticism of E. for not taking an active military part is misconceived. E. duly severed diplomatic relations with the Axis (q.v.), but she was not obliged under the treaty to make active war upon Britain's enemies: nor, indeed, was the Egyptian army in a condition to measure its strength against the Its., much less the Gers. Moreover, it was an open secret that some of the Egyptian army leaders with good connections in the Palace favoured the Axis, whose political principles appealed to them more than those of the W. democracies. Indeed, it was from the Palace that came the chief opposition to cordial co-operation with the Allies throughout the war. The crisis came, as we have seen above, in 1942 when the Brit. Eighth Army had just been driven back for the second time across the borders of Tripolitania, the Japanese seemed to be all-conquering in the Far E., and Russia at bay at Stalingrad. It was then that the Brit. Ambassador (Sir Miles Lampson, afterwards Lord Killcarn) demanded an audience of King Farouk and supported his demands by surrounding the Abdin Palace with Brit. troops. It was on the Ambassador's insistence that the King summoned to the premiership Nahas Pasha, leader of the largest political party and traditional upholders of national independence. The demand might therefore seem to have been inexplicable, but Nahas had signed the Treaty and it was calculated, and rightly, that of all E.'s politicians, he might be most relied upon to uphold its terms. Nahas continued in power for the ensuing two years, in face of increasing political and economic difficulties, until a scandal involving public charges of corruption, sensational even by Middle E. standards, gave the King an opportunity to dismiss him and his party. Nahas was replaced by the Saadist party leader, Ahmed Maher, who was murdered a few months later after declaring war on the Axis.

After the war, the Egyptian Gov. asked for a revision of the treaty on the plea that it had been made in the midst of an international crisis and that the war had exhausted the treaty's prin. objectives. It was also averred that the presence of foreign troops, even though stationed in distant areas, was wounding to national dignity and could only be interpreted by public opinion as a tangible sign of mutual mistrust. The Egyptian Note said that E. would shrink from no sacrifice in order to place her military potential in a state enabling her to repel aggression pending the arrival of the reinforcements of her allies and of the United Nations (q.v.). The Brit. Gov. was willing to revise the treaty arrangements 'in the light of their mutual experience and with due regard to the provisions of the United Nations Charter.' This exchange of Notes followed months of growing agitation by most sections of politically-conscious Egyptian opinion for the withdrawal of Brit. troops. On Sept. 23, 1945, the cabinet of Nokrashy Pasha took the extreme step of issuing a communique calling for evacuation of Brit. troops and for the incorporation of the Sudan with Egypt. Two months earlier even Nahas Pasha had presented similar demands to the Brit. ambas. on his own initiative. On Nov. 12, 1945, King Farouk, in his speech from the throne on the opening of Parliament, repeated the demand for 'an end to all restrictions on Egyptian independence.' In the first fortnight of Feb. 1946 students—Egypt's professional demonstrators—staged anti-Brit. demonstrations in Cairo and Alexandria. There were collisions with the police and in the result Nokrashy's gov. resigned. As his successor the king chose Ismail Sidky Pasha (q.v.) a doyen of Egyptian 'big business' and wealthy elder statesman. His return did not please the young Nationalists or the nascent Egyptian Labour movement. The climax came on Feb. 21 with riots in Cairo. Brit. service clubs and institutes were attacked and looted. Brit. troops opened fire on the mob and some twenty Egyptians were killed. The Brit. Gov., angered at the failure of the Egyptian authorities to protect Brit. property and personnel, demanded compensation and the punishment of the guilty. The Egyptian Gov. conceded the demands in principle and their new-found firmness had at least the effect of restoring order in the cap. Although the former front shown by Sidky Pasha kept the cap. reasonably quiet, in Alexandria there was a violent outbreak on March 4 in which, for the first time, Brit. lives were lost. In Jan. 1947 the Egyptian Gov. broke off negotiations, and later appealed to the Security Council of the United Nations to instruct Britain to withdraw troops from Egypt and the Sudan and the existing administrative regime in the Anglo-Egyptian Sudan. The Security Council, however, did not make any recommendation. Nevertheless the Brit. Gov. evacuated its troops from Alexandria and Cairo early in 1947.

E. was involved in the Arab-Jewish struggle over the partitioning of Palestine, which was recommended in Nov. 1947 by a committee appointed by the General Assembly of the United Nations. The Arab League refused to recognise partition and, following the termination of the Brit. mandate in Palestine, Egyptian troops invaded Palestine in the S., while the Transjordan Arab Legion and Syrian and Lebanese troops invaded the country in the N. and E. (May 1948). A truce supervised on June 11, by which date the Egyptian army had reached Isdud, 20 m. S. of Tel Aviv, and occupied positions running S.E. from Majdal through Faluja to Boersheba and linked up with the Arab Legion at Bethlehem. When hostilities were resumed the Arabs sustained sev. defeats and accepted a renewal of the cease-fire (July 19). Israeli troops then decided to take the offensive against Egypt and a large Egyptian force was surrounded at Faluja, 20 m. N.E. of Gaza. Egypt then became the sole target of Israeli pressure. Israeli troops entered Egyptian ter. in Dec. but were driven back and a truce was finally arranged for Jan. 7, 1919, a general armistice being signed at Rhodes on Feb. 24 (see further under PALESTINE) See also ANGLO-EGYPTIAN SUDAN; HIEROGLYPHIC; HIERATIC, and DEMOTIC WRITING; NILE.

Bibliography.—ANCIENT: G. Maspero, *Egyptian Archaeology* (Fr. 1887), 1889, 1902; W. M. Flinders Petrie, *History of Egypt, 1896-1927*; J. H. Breasted, *A History of the Ancient Egyptians*, 1912; E. A. Wallis Budge, *History of the Egyptian People*, 1923, and *Guides to the various Egyptian Rooms in the British Museum*; H. Carter and A. O. Mace, *The Tomb of Tut-ankh-Amen*, 1923-33; A. E. P. Weigall, *Ancient Egyptian Works of Art*, 1924; *History of the Pharaohs*, 1925-7; J. Balkie, *The Amara Age*, 1926; E. Denison Ross, *The Art of Egypt through the Ages*, 1931; J. D. S. Pendlebury, *Tell-el-Amara 1935*; Sir H. Idris Bell, *Egypt from Alexander the Great to the Arab Conquest: A Study in the Diffusion and Decay of Hellenism*, 1948.

The article 'Egypt' in the *Ency. Brit.* is a storehouse of the latest expert knowledge with full bibliographies to all the latest sections. MODERN: E. Lane, *Manners and Customs of the Modern Egyptians*, 1836; E. Dickey, *The Story of the Khedivate*, 1902; C. Freyenet, *La Question d'Egypte*, 1905; Earl of Cromer, *Modern Egypt*, 1908; A. E. P. Weigall, *Travels in the Upper Egyptian Deserts*, 1909, and *A History of Egypt from 1763-1914*, 1915; A. Hasenklever, *Geschichte Ägyptens im neunzehnten Jahrhundert*, 1917; E. Driault, *Mohammed Aly et Napoléon*, 1925, and *L'Égypte et l'Europe*, 1935; G. Young, *Kgypt, (Modern World Series)*, 1927; C. S. Jarvis, *Yesterday and Today in Sinai*, 1931, *Three Seas*, 1936, and *Desert and Delta*, 1938; C. C. Adams, *Islam and Modernism in Egypt*, 1933; Sir Arnold Wilson, *The Suez Canal*, 1933; Lord Lloyd, *Egypt since Cromer*, 1933-34; G. W. Murray, *Son of Ismail: A Study of the Egyptian Bedouin*, 1935; A. E.

Crouchley, *The Economic Development of Modern Egypt*, 1938; A. Sammarco, *Histoire de l'Égypte moderne*, 1938; R. Fedden, *The Land of Egypt*, 1939; F. Leprette, *Égypte, terre du Nil*, 1940; C. Issawi, *Egypt: An Economic and Social Analysis*, 1947; M. Rifaat Bey, *The Awakening of Modern Egypt*, 1948; Eileen Bigland, *Journey to Egypt*, 1948.

Egypt Exploration Fund was founded in 1883 by Miss Amelia Edwards, who was greatly interested in Egyptian antiquities, and who was one of its first secretaries. Indeed, she gave up her other literary work to devote her time to writing about Egypt, her work being pub. under the title *Pharaohs, Fellahs, and Explorers*. The object of the society is to collect all the information possible which has reference to the hist. and nature of the sites excavated. The society pub. annual reports, which are beautifully illustrated. Some of the distinguished men who have worked for it are Professor Hinds Petrie, Professor Gardner, and Doctors Grenfell and Hunt.

Egypt, First World War Campaign in. Although Turkey was not in a state of war with Great Britain until Nov. 5, 1914, she had been under Ger. influence for some years before the First World War broke out, and an alliance actually existed between the two countries. The Central Powers had regarded Egypt as the 'throat of England,' and to Turkey had been allotted the task of throttling England, when such a task was considered strategically necessary. In Oct. 1914 Germany's fortunes were at a low ebb; she had lost the battle of the Marne, Russia had overrun E. Prussia, the Austrians had suffered heavily at Lemberg, and reinforcements to Brit. arms were moving freely from India and the dominions. The time had therefore arrived for Turkey to come into the arena of war and play her allotted rôle. The pre-war Brit. garrison was required in France, and in Sept. 1914 the 42nd (E. Lancs.) Territorial Div. was sent out to replace it. Troops from India, Australia and New Zealand also arrived, and by the end of 1914 about 70,000 troops were concentrated in E. Early in Nov. 1914 a Turkish force under Jemal Pasha advanced through the Sinai peninsula against the Suez Canal. Jemal's Chief of Staff was Col. Kress von Kressenstein, a Bavarian officer of great ability and energy. They advanced in three columns, and arrived at the canal on Jan. 25, 1915. Their strength was about 12,000-15,000 men. They raided Kuberi, 7 m. N. of Suez, on Jan. 27, and Kantara on Jan. 28. On the night of Feb. 2-3 a general attack was made between Serapeum and Tussum, but was repulsed by gun-fire. The Turks succeeded in throwing three pontoons across the canal, but all the Turks in them became casualties. At 9.30 a.m. on Feb. 3 the enemy brought up reinforcements and made another but equally unsuccessful attempt, and withdrew at 1.30 p.m., leaving sixty dead and 300 prisoners with the Brit. The next operations were against the Senussi (a Moslem nonconformist sect founded in

1835), which occupied the W. desert, with centres at Kufra and Siwa. The sect had many adherents in E. and was susceptible to Turkish propaganda. The Kaiser sent Sayed Ahmed, their leader, arms and munitions by submarines, which were landed on the coast of Tripoli. In Nov. 1915 they captured the crew of H.M.S. *Tara*, which had been torpedoed near Sollum, and committed other hostile acts against the Brit. This led Gen. Sir John Maxwell, the Brit. commander-in-chief in this theatre, to take offensive action against them. Actions were fought at Hazalin and at Agadir in Dec. 1915 and March 1916, respectively, in which the Senussi lost heavily. An armoured car detachment under the command of the duke of Westminster found forty survivors of the *Tara* in a distant camp and rescued them.

When the Gallipoli Peninsula was evacuated the Brit. troops went to E., and the whole of the garrison was reorganised under Gen. Sir Archibald Murray. The total force amounted to thirteen divs., six of which were sent to other theatres of war. A line to the East of the Suez Canal was occupied, where a much-advertised Turkish advance was awaited. They were under the command of Kress von Kressenstein, and numbered about 18,000 men. By the middle of July 1916 they were in touch with the Brit. outposts. On the night Aug. 3-4 they attacked Roman, but, being heavily counter-attacked, fell back in disorder, having suffered 9000 casualties, 4000 being prisoners. The Brit. followed up this success and drove the Turks out of E., the Sinai Peninsula and eventually out of Palestine.

Egyptian Bean, name sometimes given to the bean-like fruits of *Nelumbium speciosum*, the sacred Lotus, now found only in Asia and Australia. The seeds are eaten in some parts of India, and are believed to be the beans which Pythagoras forbade his disciples to consume.

Ehrenbreitstein, until 1919 'the Gibraltar of the Rhine,' tn. of Germany, on the Rhine opposite Coblenz. The fortress is famous, and is situated on an almost inaccessible rock, 400 ft. high. The sides are steep except on the S. where the approach is winding and strongly defended. It was conquered in 1631 by the Fr., in 1637 by the Imperialists, and again in 1799 by the Fr. The castle is ant. and the site was a Rom. fort. In the eleventh century, a noble named Erembert held it, from whom it derived its name. In the twelfth century archbishop Hillin of Trier had possession of it. When the Allied troops of occupation were stationed on the Rhine after the 1914-18 War Amer. soldiers occupied the fortress and the Amer. flag flew over it. Pop. 5500.

Ehrenburg, Ilya Grigorievitch, b. in 1891, is one of the best novelists and poets of the young generation of Russians. He spent a good many years of his youth abroad, but returned in time to live in Russia the four stormy years after the 1917 revolution. Outside his own country, he is best known in Germany, where

many of his books have been trans. There is an acrimonious tone about most of them which stamps him as a pamphleteer rather than romancer. His best novel is *Julio Jurenito*, which seeks to give a picture of most of Europe after the First World War. His most successful book of short stories gives the true facts connected with thirteen pipes in his collection and the lives of those who once owned them. One of his most beautiful poems is *The Sons of Our Sons*, in which he tells how future generations will think the war period was all blood and horror, whereas the truth was that flowers still bloomed, birds still sang, the sun still gilded the trees, and the sons of men still rejoiced in these lovely things. Lived mostly in Paris, but often returned to Russia to study political and social progress achieved under the Soviet system. His novel *The Second Day* (1934) made its appearance in the post-revolutionary period. Its 'hero' is the collective body of builders of Kuznetskstroy, the coal and metallurgical centre. During the Second World War he proved an effective propagandist with an unerring sense of vivid reporting. He has written ten novels and vols. of short stories including *The Loves of Jeanne Ney* (1924), *A Street in Moscow*, *The Fall of Paris* (Stalin prize novel), 1942; and *The War* (short stories), 1943.

Ehrlich, Paul (1853-1915), Ger. chemist, b. at Strehlen, Silesia. His first notable discovery was of 'tri-acid stain.' At the Koch Institute, Berlin, his standardisation of anti-toxins won for him the appointment in 1906 as head of the Institute for Experimental Therapeutics, Frankfurt-on-Main. His chief discovery was of Salvarsan as a remedy for various diseases, including syphilis, made in conjunction with the Jap. doctor S. Hata. He shared the Nobel Prize for medicine with Metchnikoff, in 1908. See M. Marquart, *Paul Ehrlich als Mensch und Arbeiter*, 1924.

Eibar, tn. of Spain in the prov. of Guipuzcoa, noted for its damascened 'E. work.' Pop. 11,840.

Eibenstock, tn. of Saxony, Germany, situated on the R. Mulde. It is a centre of the tambour embroidery. Pop. 10,000.

Eichendorff, Joseph Freiherr von (1788-1857), Ger. poet, b. at Lubowitz. He was a famous member of the Ger. Romantic school. His chief work of romance is *Aus dem Leben eines Taugenichts* (1826); and his chief dramas are: *Ezzelin von Romano* (1828), *Der letzte Held von Marienburg* (1830). He is best known, however, as a lyric poet; indeed, he is the greatest lyricist of the Ger. Romantics. His language is simple and musical; some of his poems have been set to music both by Schumann and Schubert. Two of his best lyrics are *Nachts* and *Waldegespräch*. See lives by J. Nadler, 1908; J. Hoyer, 1931; R. Wehrli, 1938.

Eichhorn, Hermann von (1848-1918), Ger. soldier, b. at Breslau. Won the Iron Cross in the Franco-Ger. War of 1871. In the First World War he served throughout on the Russian front. He came into

prominence as one of Hindenburg's chief lieutenants in the E. Prussian campaign, in which he took a notable part in the second battle of the Masurian Lakes (Feb. 1915). As commander of the Tenth Army he directed the operations against the Niemen, and was in command of the forces which captured the important stronghold of Kovno in Aug. 1915, whereby the Russians were compelled to abandon Brest-Litovsk and the whole of Poland. In 1918, he was made field-marshal and Ger. commandant in the Ukraine. Bombed in the streets of Kiev by social revolutionists, he died of his injuries.

Eichhorn, Johann Gottfried (1752-1827), Ger. historian, b. in Dörrenzimmern, Franconia. In 1788 he was made prof. at Göttingen, where he lectured both on oriental languages and on political economy. He is important as being the first to subject the books of the Bible to the ordinary methods of literary criticism. He was of the old school of rationalists, now superseded by the historico-critical.

Eichstätt, or Eichstätt, formerly Eistat, tn. of Bavaria, Germany, in Franconia. It is situated on the Altmühl, in a deep valley, 38 m. S. of Nuremberg. The cathedral was begun in the eleventh century. Other noteworthy buildings are the Schutzensel (protecting angel) church (1640), the church of the Capuchin monastery, with an imitation of the Holy Sepulchre at Jerusalem, etc. The tn. owes its origin to the grave of St. Walpurgis, and St. Willibald, an A.-S. missionary, to which pilgrimages were made from A.D. 870. Pop. 9000.

Eider, riv. of Germany, which rises to the S. of Keil. It crosses Schleswig-Holstein, forming a boundary between those two divs. Its direction is first N. and then generally W., but it has an exceedingly winding course, and after flowing 117 m. it enters the N. Sea at Tönning. The E. is navigable as far as Rendsburg, a distance of 70 m., and from this place the Kaiser-Wilhelm canal connects it with the Baltic Sea.

Eider-Duck, popular name of a species of *Somateria*, included in the sub-family Fuligulinae of the duck family Anatidae. They inhabit N. regions and are to be found on the coasts of the Atlantic and Pacific. The commonest species, *S. malimbica*, is occasionally found in Britain in the breeding season. The bill and feet are olive green, and the down is much valued in commerce for stuffing quilts and cushions. Other well-known species are *S. spectabilis*, the king E., which furnishes most of the down exported from Greenland; *S.* (or *Hemionetta*) *stellata*, known as Steller's E.; *S.* (or *Ardeonetta*) *fischeri*, the spectacled E. The common E. nests on rocky is. near the shore from the Farne Is. to Spitzbergen and is protected in Norway and Iceland.

Eidograph (Gk. *eidos*, form; *graphein*, write). This is a machine which is often used instead of a pantograph, and is employed for copying drawings, maps, and plans on the same scale, or for enlarging or reducing them in any proportion.

Eifel, volcanic plateau of the Rhineland, stretching from the frontier of Belgium to the Rhine and the Moselle. The heights reach from 1500 to a little more than 2000 ft., and the surface is generally undulating, with ridges and well-wooded valleys. The plateau is composed principally of Devonian rocks and limestone, with numerous fossils.

Eiffel, Alexandre Gustave (1832-1923), Fr. engineer, b. Dec. 15, at Dijon. Studied at the Ecole Centrale for three years. His first work was the construction of the iron bridge over the Garonne at Bordeaux, where he worked his 'caissons' with compressed air. The bridge over the Douro at Oporto, the viaduct of Garabit, as well as other metal bridges, are also his work; and it was he who designed the immense locks for the Panama Canal. His best-known work is the E. Tower, on the completion of which in 1889 he was made an officer of the Legion of Honour. In 1907 he pub. *Recherches expérimentales sur la résistance de l'air, exécutées à la Tour Eiffel*. Later, he made experiments in aeronautics, on which he pub. two books and also a report in 1919, and, in 1920, *L'Efface aérienne*.



E.N.A.

THE EIFFEL TOWER, FROM THE SEINE

Eiffel Tower, iron structure which stands in the Champ de Mars, Paris, on the S. bank of the Seine. It was designed for the Paris Exhibition of 1889 by Gustave Eiffel (q.v.) and was erected 1887-89.

It consists of three stories or platforms, the platform of the summit being 985 ft. above the ground. Almost 7500 tons of iron were used in its construction, and the cost of its erection was about \$250,000. The ascent to the top is made by powerful electric lifts. The tower is an important station of wireless telegraphy and broadcasting station and meteorological centre.

Eiger (Ogre), mt. of Switzerland, in the Bernese Oberland, situated about 4 m. from the Jungfrau. First ascent 1858, Mittelegg ridge, 1921. Its immense N. face, which towers above Grindelwald, was the last great unsolved climbing problem in the Alps, until it was scaled by an Austro-Ger. Party in 1938. Its height is 13,040 ft.

Eigg, or **Egg Island**, is. belonging to the Hebrides, W. Scotland, situated 5 m. S.W. of Skye. It has an area of 12 sq. m. The S. extremity, called the Scaur of Eigg, is a remarkable basaltic cliff, reaching 1346 ft. in height. In one of the caves 200 of the Macdonalds were suffocated by the Macleods. Pop. 197.

Eight Hours Labour Law, Act passed by Congress in 1912 limiting the hours of daily service of labourers and mechanics employed upon work done for the United States or for any Territory or for the District of Columbia to eight hours.

Eight, Piece of, popular name given to an old Span. silver coin. It was divided into eight silver reals, hence the term P. of E. Other names for it were plastre or dollar. (See DOLLAR and PIASTRE.) Its value was about 4s.

Eight Points, see ATLANTIC CHARTER.

Eighth Army, formed in Nov. 1941, of the Brit. forces in the W. Desert, thus carrying a stage further the reorganisation under which the Middle E. forces were divided into a W. Army (Egypt and the W. Desert) and an Eastern Army (Palestine and Syria): the creation of the E. A. separated the Brit. forces in the W. Desert from those in Egypt and was in fact a new incarnation of the Army of the Nile or Desert Army which, under the command of Gen. Maitland Wilson and the supreme direction of Gen. Wavell, won the first great victory over the Its. in the W. Desert. Under Sir Alan Cunningham the E. A. launched its own first offensive against the Axis forces on the Egyptian frontier on Nov. 18, 1941. The commander-in-chief, Gen. Auchinleck, anticipated his adversary's projected offensive by a few days and this gave the E. A. the initiative, which, however, he was dangerously near losing through the superior equipment of the Axis army. But if the Brit. victory was indecisive the battle ended in Jan. 1942, with Tobruk relieved, the Axis frontier garrison destroyed and Gen. Rommel's (q.v.) mobile Afrika Korps hurried back to the Gazala line. But Rommel's attack in the following May brought a reversal of fortune. His superior armour won a decisive victory over Lieut-Gen. N. M. Ritchie, who had taken command in the middle of the previous battle, and in the result Tobruk was lost and Rommel's Axis army advanced to Alamein and

threatened Egypt. But Gen. Auchinleck, assuming personal command of the weakened remnants of the E. A., brilliantly averted disaster. The way to Alexandria was barred still more securely at the end of Aug. when Rommel launched a great offensive against the Alamein line; for under its new commander Lieut.-Gen. B. L. Montgomery and commander-in-chief, Gen. Sir Harold Alexander, the E. A. hurled the Axis back in the now classic battle of El Alamein (officially styled Alemel Malfa). In the first week of Oct. the E. A. launched its most famous offensive, driving the Afrika Korps right across Libya, Cyrenaica, and Tripolitania. It broke the Mareth Line and entered Tunisia to co-operate with Lt.-Gen. Anderson's First Army and the Amer. forces already there, in shattering Axis resistance and completely destroying the last armies of the enemy in Africa.

For the Brit. Empire El Alamein was the turning-point of the Second World War. The battle proved not only the first great engagement lost by Germany, but the means to a succession of Allied victories across Africa and S. Europe. No Power had ever previously mustered so cosmopolitan an army as the E. A.; in it were men from almost every part of the Brit. Empire and they were welded together by superb training into a supremely efficient and confident military formation. Together with the Amers. and the Brit. First Army they were the first Allied troops to assault the fortress of Europe. Among the divs. of the E. A. that invaded Sicily there were only two from the old Desert Army, and Canadian regiments had now joined it. But the spirit and tradition which had brought the Eighth, after bitter disappointments, on its triumphant advance of 2000 m. under Lt.-Gen. (later Field-Marshal) Montgomery were the same, and the Crusaders' Cross still remained their proud badge. In Sept. 1943 the E. A. landed on the It. mainland and by Christmas they were N. of the Rome line. Its constitution had now become not merely imperial, but international. The original design of this campaign was that the E. A. should draw Ger. divs. down to the S. while the Amer. Fifth Army landed at Salerno. Later the task was to hold as many of Kesselring's Ger. divs. as possible in Italy in order that the Allied armies on the W. Front should have fewer to overcome. Combined movements of the E. A. and the Fifth brought about the fall of Rome two days before the Allied invasion of Normandy in June, 1944. The E. A. under the immediate command of Lieut.-Gen. Leese and Field-Marshal Alexander's supreme command, moved from the Adriatic to the Cassino front unsuspected, then drew most of the Ger. troops eastward and so enabled the Fifth to break through the Gothic Line. In the spring of 1945 the E. A. opened the offensive with a magnificent start in which, besides Brit., New Zealand and Indian troops, Polish, Jewish and It. units shared. The swift success of this advance brought the E. A. to Trieste and into Austria and

so to the close of its famous career. In the course of nearly four years its constitution repeatedly changed. The Australians who had served early in its hist. returned to their own land to meet the Jap. menace. Some of the Brit. and Indian troops also went E. From Italy divs., including the famous 'Desert Rats'—the Seventh Armoured corps with a desert rat for its emblem—were withdrawn to take part in the invasion of France in the Twenty-First Army Group. Later its Canadian corps was also sent to France. See: H.M. Stationery Office, *The Destruction of an Army*, 1942, and *The Battle of Egypt*, 1943; H. Rowan-Robinson, *Wavell in the Middle East*, 1942; A. B. Austin, *The Birth of an Army*, 1943; R. J. Crawford, *I was an Eighth Army Soldier*, 1944; Viscount Montgomery, *El Alamein to the River Sangro*, 1948. The E. A. headquarters was disbanded in July, 1945. See also under AFRICA, NORTH, SECOND WORLD WAR CAMPAIGNS IN; ITALIAN FRONT IN THE SECOND WORLD WAR; LIBYA, CAMPAIGNS IN; SICILY, BATTLE OF.

Elkon Basilike (Εἰκὼν Βασιλική) (*The Portraiture of His Sacred Majesty in his Solitudes and Sufferings*). This work was pub. immediately after the death of King of England, Charles I., and being written in the first person was ascribed to Charles himself. Indeed, his words about his treatment of Strafford confirm that belief. Dr. John Gauden said he started the work about 1617, and submitted it to Charles, but those in favour of Charles' authorship say that he wrote the first six chapters before 1645, i.e., before the battle of Naseby. The general verdict, however, is against Charles.

Eildon Hills are three high hills situated near Melrose, Roxburgh, Scotland. The central peak rises to an elevation of 1385 ft., and commands a most magnificent view of the surrounding country. The remains of a Rom. camp are to be seen on one of the hills, and sev. legends are told concerning them. The poet Thomas the Rhymer is associated with them, and Scott remarked that, standing on the Eildons, he could point out forty-three places famous in war and verse.

Eileithyaspolis, Gk. name of Nekhab, a city of anct. Egypt, which stood on the Nile about 40 m. from Luxor or Thebes. In anct. Egypt, E. or Nekhab, now represented by the ruins of El Kab, was the cap. of Upper Egypt. In the midst of every tn. was the temple of the local god, and the vulture-goddess of El Kab, called Nechbet (Nekbbi, Nekhebi), was the goddess E. of the Gks. The city contains the ruins of the following temples: that of Rameses II. dedicated to Ra, another built by Euergetes II. and dedicated to Nekhab (E.), and a third by Amenophis III. which is dedicated to the local deities. Some rock-tombs have also been excavated, some of which date back to the thirteenth century. The remains are now very scanty because all the stones worth taking were appropriated for the building of sugar factories under the Khedives Mehemet Ali and Ismail Pasha.

Eilenburg, tn. of Saxony, Germany, noted for manufs. of agric. implements, calico, and cloth; and also breweries and chemical works. E. possesses an anct. castle, known as Ilburg. Pop. 19,600.

Eilendorf, tn. of the Rhineland, Germany, situated about 3 m. from Aachen. Pop. 17,000.

Elilithya (Εἰλιθυα), called also Ilithya, was the impersonation of the pains of childbirth, and was therefore worshipped as the goddess who assisted women in labour. But seeing that all moon-goddesses had influence over birth, she is identified at times with Artemis, Hera, and Aphrodite. According to the Cretan legend, E. was born at Cnossus, and from there her worship spread over Delos and Attica. Another legend says she was born in Crete, but came to Delos to assist Leto. She is at times connected with the Fates, who also have control over childbirth.

Eimeo, or **Aimeo**, called by the Fr. **Moorea**, the most important of the Fr. Society Is. in the Pacific Ocean, is situated about 15 m. N. of Tahiti. Its area is about 50 sq. m.; its surface is hilly and the valleys are well cultivated. The London Missionary Society was estab. on this Is.

Einbeck, tn. of Hanover, Germany, 50 m. S. of Hanover. The picturesque old inner tn. is still partially enclosed by its former fortifications, and contains the fourteenth-century Alexander church, thirteenth-century Market church, fifteenth-century New town church, the sixteenth-century town hall and fine medieval houses. From the end of the fourteenth century its beer brought it prosperity. It is noted for carpets, engraving tools, and weaving machinery. Pop. 10,000.

Einölschtal, the Ger. name, more correctly spelt **Elvischtal**, of Val D'Anniviers, an Alpine glen in the Swiss canton of Valais. It is a summer resort, and its chief vil. is Sierre.

Einhard, **Einhard**, or **Eginhard** (c. 770-840), the biographer of Charlemagne, b. in E. Franconia. Owing to his extraordinary ability he came under the notice of Charlemagne at an early age. His artistic skill gained for him the name of 'Bezaleel,' and the basilica of Aachen, as well as other buildings, have been attributed to him. He became very friendly with the emperor, and when he died, Louis, his son and successor, appointed E. tutor to his own son Lothair. His best work is *Vita Caroli Magni*, which is a splendid biography of Charlemagne and is perhaps the finest historical biography of the Middle Ages. Of his other works, the most important are: *Epistole*, *De Adoranda Cruce*. His authorship of *Annales Francorum* is not certain. See M. Buchner, *Einhard's Künstler und Gelehrtenleben*, 1922.

Einsiedeln, tn. in canton Schwyz, Switzerland, the most famous pilgrim-resort in Switzerland, with a Benedictine Abbey, founded about 948 on the site of the cell of St. Meinrad, who was murdered in 881. It was dowered with land by two emperors, and became an independent principality of the Holy Rom. Empire.

The church (1719-35) is 446 ft. long, and is one of the most noble works of the baroque period. In the Gnaden-Kapelle is the 'Black Virgin,' a richly decked miracle-working image in wood. The Abbey Library comprises 100,000 vols., and 1300 MSS., some of the eighth to the twelfth centuries. The celebrated chemist Paracelsus was born here in 1493. Pop. 8,400.

Einstein, **Albert** (b. 1879), propounder of the theory of Relativity (q.v.), b. at Ulm in Wurttemberg; son of Hermann E., a Jew, described as owner of electro-technical works. The family removed to Munich during the childhood of Albert, who was slow in learning to speak, shy,



Topical Press

ALBERT EINSTEIN

and unsociable, with a taste for music. His early education was Jewish at home, Catholic at school. When older, he attended the Luitpold Gymnasium at Munich. In 1894 the family removed to Milan, and Albert began wandering tours in N. Italy. He wandered into Switzerland, and at Aargau studied mathematics and physics at the canton school. With a view to school-mastering, he began studying at Zurich Technical School at the age of seventeen, and remained there four years. He afterwards acted as tutor at Schaffhausen and Bern. In 1901 he was naturalised a Swiss citizen; and he was engaged as a technical expert in the Patent Office at Bern, 1902-5. In 1903 he married a S. Slavonic student from whom he was afterwards divorced. In 1905 he pub., in the *Annalen der Physik*, papers on the production and transformation of light, the Brownian movements, molecular dimensions, and the electrodynamics of moving bodies. The last-named brought him under the notice of Max Planck (q.v.). In 1909 he became prof. extraordinary at Zurich of Theoretical Physics; in 1911 prof. ordinary at

Prague. In the autumn of 1912 he returned to Zürich as professor at the Polytechnic. Early in 1914 he was appointed director of the Kaiser Wilhelm Physical Institute at Berlin, in which city he resided until 1933, when, owing to his Jewish origin, he was deprived of his appointment and took refuge in England. Later, he went to America and became a prof. at Princetown, N. Jersey. His second marriage was with a cousin of the same surname. By 1916 he had pub. *Die Grundlage der allgemeinen Relativitätstheorie*; followed by *Über die spezielle und die allgemeine Relativitätstheorie* (1921). E. gave a new direction to thought on the propagation of light and allied subjects by pointing out that time and space are not absolute, but merely relative to the observer. He gradually overcame the great mathematical difficulties, and his work has affected that of all subsequent mathematicians and astronomers. His theory was not verifiable experimentally until he applied it to gravitation, when he predicted that the deflection of a ray of light by the sun should be twice what the Newtonian theory would indicate. Observations made during the total eclipse of 1919 confirmed the E. theory. In Jan. 1921 he was lionised by philosophers and astronomers in U.S.A. and England. His doctrine, falling in with the reaction towards mysticism, has invaded philosophical as well as scientific fields of thought. Newton's dynamics still suffice to a high degree of accuracy for practical purposes, but for ultimate physical concepts it seems that Newton's theory is superseded by E.'s. He has written books on other subjects, among them *About Zionism* (1930), *Why War?* (with S. Freud) 1933, *My Philosophy*, 1934, *The Evolution of Physics* (with L. Infeld), 1938. See P. Frank, *Einstein, His Life and Times*, 1948.

Eire (Ireland), or Republic of Ireland. E. is the official name, since the passing of the Constitution Act of 1937, of what, prior to Dec. 29 of that year, constituted Saorstát Éireann or the Irish Free State. (The Act itself purports to embrace in the name "Eire" the whole of Ireland (*q.v.*), the intention of Mr. de Valera (*q.v.*), the chief sponsor of the new Irish Constitution, being to promote the unity of Ireland. The Brit. Gov., however, has made it clear that it does not recognise this larger connotation). In 1949 E. became a republic and left the Brit. Commonwealth of Nations.

Area and Population.—According to the census of 1916, the following are the areas and population of the provs., co. and co. bors. of Eire. The names of the caps. appear in parenthesis. (See next column.)

Constitution.—The constitution of E., which came into operation in 1937, declares that Ireland is a sovereign independent democratic State and affirms the right of the Irish nation to choose its own form of gov., to determine its relations with other nations, and to develop its life, political, economic and cultural, in accordance with its own genius and traditions. The constitution applies to the

PROVINCES, COUNTIES AND COUNTY BOROUGHS	AREA IN STATUTE ACRES	POPULATION
Prov. of Leinster		
Carlow (Carlow)	221,485	34,048
Dublin Co.	208,984	635,876
Dublin Co. Bor.	18,740	(506,635)
Kildare (Naas)	418,644	64,834
Kilkenny (Kilkenny)	509,470	66,683
Leix (Maryborough)	424,892	49,634
Longford (Longford)	257,935	36,221
Louth (Dundalk)	202,814	66,135
Meath (Trim)	577,824	66,220
Offaly (Tullamore)	493,636	53,644
Westmeath (Mullingar)	435,605	54,880
Wexford (Wexford)	581,061	91,704
Wicklow (Wicklow)	500,250	60,340
Total of Leinster	4,851,340	1,280,219
Prov. of Munster		
Clare (Ennis)	787,756	85,071
Cork County	1,840,908	343,243
Cork Co. Bor.	2,685	75,361
Kerry (Tralee)	1,161,705	135,818
Limerick (Limerick)	661,585	142,180
Limerick Co. Bor.	2,386	42,987
Tipperary	1,051,292	135,981
Waterford Co.	452,840	76,157
Waterford Co. Bor.	1,438	28,332
Total of Munster	5,962,595	916,750
Prov. of Connaught		
Galway (Galway)	1,467,660	165,196
Leitrim (Carrick on Shannon)	376,764	44,578
Mayo (Castlebar)	1,333,941	148,200
Roscommon (Roscommon)	608,540	72,511
Sligo (Sligo)	443,917	62,331
Total of Connaught	4,230,822	492,816
Prov. of Ulster		
(part of)		
Cavan (Cavan)	467,162	70,323
Donegal (Lifford)	1,193,581	136,136
Monaghan (Monaghan)	318,985	67,208
Total of Ulster	1,979,728	283,667
(part of)		
Total for Eire	17,024,485	2,953,452

whole of Ireland, but it provides that, pending the reintegration of the national ter. the laws enacted by the Parliament estab. by the constitution shall have the same area and extent of application as

those of the Irish Free State, which did not include the six Northern Counties or Province of Ulster known as Northern Ireland (*a.v.*). The President of Ireland (*Uachtarán na h-Eireann*) is elected by direct vote of the people for a period of seven years. On the advice of the Prime Minister (*Taoiseach*) the President summons and dissolves *Dail Eireann* (i.e. the Irish Commons). He signs and promulgates laws. On the nomination of the Dail, he appoints the *Taoiseach* and on the nomination of the latter and with the previous approval of the Dail he appoints the other members of the gov. In the exercise and performance of certain of his constitutional powers and functions, the President is advised by a Council of State. The Parliament—*Oireachtas*—consists of the President and two Houses: a House of Representatives or *Dail Eireann*, and a Senate—*Seanad Eireann*. The Dail consists of 147 members elected by adult suffrage on a basis of proportional representation. The Seanad consists of sixty members, of whom eleven are nominated by the Prime Minister, six elected by the univs., and forty-three from panels of candidates estab. on a vocational basis. The executive power of the state is exercised by the gov., which is responsible to the Dail and consists of not less than seven and not more than fifteen members. The constitution contains special provision for the recognition and protection of the fundamental rights of citizens, such as personal liberty, free expression of opinion and so forth. Freedom of conscience and the free practice and profession of religion are, subject to public order and morality, guaranteed to every citizen. No religion may be endowed or subjected to discriminatory disability. The special position of the Catholic Church as the guardian of the faith protected by the majority of the citizens is recognised by the State.

Local Government.—Ireland is divided into twenty-seven administrative cos. and four co. bors. governed by councils elected triennially. The co. councils administer co. affairs generally levy rates and borrow money; the co. bor. councils possess with certain exceptions the powers of co. councils. The administrative cos. include the urban co. dists. which are urban areas that have been constituted sanitary dists. Each such dist. is governed by an elected council that administers the Acts relating to public health, housing, maternity and child welfare, etc. An enlarged rural sanitary dist., called the co. health dist., was created by the Local Gov. Act, 1925. This dist. generally extends over the co. with the urban dists. excluded. The co. council performs its duties as a health authority directly, and appoints a co. medical officer of health. The co. council is also usually the public assistance authority and co. homes have been set up for the aged and infirm, and co. and dist. hospitals for the sick. Home assistance is the normal method of poor relief. Old age pensions are a charge on State funds but local authorities take part in the administration. Industrial and reformatory

schools are managed by religious communities, but maintained mainly out of capitation grants from both state and local funds. The local authorities have a system of gov. which combines an elected council with a manager. All functions formerly exercised by the councils other than those specifically reserved by law are exercised by the manager, a paid official who has control over all officers, and whose removal from office requires the sanction of the central authority. Elections to public bodies are held according to the principle of proportional representation. Women are eligible for election as members of all local gov. bodies on the same conditions as men.

Religion.—According to the census of 1936 the prin. religious professions were (including part of Ulster): Catholics, 2,773,920; Protestant Episcopalians, 143,030; Presbyterians, 28,067; Methodists, 9,649; other professions, 11,754. There are also approx. 2000 members of the Society of Friends.

The Judiciary.—Justice is administered by courts estab. by the Courts of Justice Act, 1924 (and amending Acts 1936, 1947). They include a Supreme Court, a High Court, a Court of Criminal Appeal, a Central Criminal Court, a Circuit Court and a District Court. The Supreme Court consists of the chief justice and four other judges, with appellate jurisdiction from all decisions of the High Court. The High Court, which consists of a president and five ordinary judges, has full original jurisdiction in, and power to determine, all matters and questions, whether of law or fact, civil or criminal. In all cases in which questions arise touching the validity of any law having regard to the provisions of the Constitution, the High Court alone exercises original jurisdiction. The Court of Criminal Appeal consists of the chief justice or some other judge of the Supreme Court and two ordinary judges of the High Court. Its decisions are final, unless either the court itself or the attorney-general certifies that the decision involves a point of law of exceptional public importance and that it is desirable that an appeal should be taken to the Supreme Court.

Education.—Elementary or primary education is free and given in the national schools. Secondary education is in private hands and is largely conducted by religious orders. There were in 1947 4957 primary schools (with an enrolment of 451,820, the percentage average daily attendance being 82). There were (1947) 395 recognised secondary schools, with 42,927 pupils between the ages of twelve and twenty years. Technical schools are estab. in all cities, the prin. tns., and some rural areas, the schools being controlled by the local authorities. Winter agric. classes for the sons of farmers are provided by statutory co. committees of agric. Univ. education is given at the univ. of Dublin (Trinity College) founded in 1591 and at the National Univ. of Ireland, founded in Dublin in 1909. The National Univ. has three constituent

colleges, viz. the Univ. Colleges of Cork, Galway, and Dublin (*see also* TRINITY COLLEGE, DUBLIN).

Defence.—The defence forces are organised on the basis of an estab. of 12,500 officers and men (permanent force) and 60,000 first and second line reserves. These figures include both the Air Corps and Naval Defence Service. The Naval Service comprises 3 corvettes and 5 motor torpedo boats. The personnel numbers 500.

Production and industry.—Agric. and the rearing of cattle (both fat and store) are the leading industries. The number of livestock in 1947 was: cattle 3,950,000; sheep, 2,094,000; pigs, 457,000; horses, 349,600; poultry, 17,304,000. The chief

£12,725,000 and raw materials and manuf. goods, £5,381,000. The statistics of distribution of trade show that a great part of E.'s trade is done with Great Britain. Imports from Great Britain were £13,037,000 and exports to Great Britain, £28,705,000. Imports from other countries were: U.S.A., £8,476,000; Argentina, £3,628,000; Brazil, £2,858,000; Canada, £2,851,000; India, £2,166,000; N. Ireland, £1,557,000; Dutch colonies, £1,261,000; Spain, £1,029,000; Belgium, £935,000; France, £873,000; Sweden, £759,000; exports to other countries: N. Ireland, £7,042,000; U.S.A., £575,000; Belgium, £478,000; France, £221,000.

Shipping.—Net tonnage of vessels entered and cleared in the foreign trade at



THE CLADDAGH, GALWAY

British Railways

crops are: potatoes (3,227,000 tons in 1946); turnips (2,264,000 tons); mangels (1,350,400 tons); oats (689,000); sugar beet (529,000 tons); wheat (463,000 tons); barley; rye; and hay (4,170,000 tons). The chief secondary industries are grain milling, bread, flour, biscuits, etc.; butter, cheese, margarine and condensed milk; bacon curing; brewing and malting; sugar, sugar confectionery and jam-making; tobacco; clothing (wholesale factories); woollen and worsted; furniture and upholstering; soap and candles; timber; distilleries; bricks, glass and cement; engineering and implements; linen, cotton, jute, and canvas; boots and shoes (wholesale factories); paper, printing; hosiery; fellmongering and leather; oils and paints.

Commerce.—The value of imports and exports for 1946 were: Imports, £72,043,372; Exports, £35,612,594. The chief imports were raw materials and manufactured goods, £53,167,000; other imports were live animals, £2,228,000 and food, drink and tobacco, £15,576,000; the chief exports were live animals, £19,867,000; food, drink and tobacco,

Irish ports in 1946 was: entered, 6318 vessels of 3,431,000 tons; cleared 6,324 of 3,438,000. The ports are Dublin, Cobh, Dun Laoghaire, Cork, Galway, Waterford, Rosslare, Limerick, and Dundalk.

Finance, currency, and banking.—Receipts were estimated in 1947-48 at £63,465,000 (customs £19,570,000; income and super tax, £13,640,000; excise, £11,695,000). Estimated expenditure totalled £66,884,000 (food subsidies, £9,796,000; education, science and art, £7,057,000; agric., land div., etc., £6,447,000; old age pensions, debt service, post office, army, about £4,000,000 each; police, £3,000,000). Total liabilities of Eire at the end of the financial year 1947 were £82,543,000; assets, £39,379,000. The unit of currency in Eire is the Irish pound, which has the same value as the pound sterling. The circulating medium consists of legal tender notes, consolidated bank notes, and token coinage. The Central Bank (estab. in 1943) has the sole right of issuing legal tender notes and token coinage is issued by the minister for finance through the

Bank. The Board of Directors of the Central Bank consists of a Governor appointed by the President of Ireland, and eight directors, all appointed by the Minister for Finance. Consolidated bank notes are a first charge on all the assets of the responsible banks, and are also secured by a reserve held by the Central Bank. They are convertible into legal tender notes which in turn are convertible into equivalent Brit. legal tender at the Bank of England. The Bank of Ireland, founded in 1783, has a cap. of £2,769,231; other banks, £3,430,000.

Communications.—There are nearly 2500 miles of railway of which 2158 are of standard (5 ft. 3 in.) gauge. There are 650 m. of inland navigation, including the Grand Canal 208 m., the Royal Canal, 96 m., and the Shannon Navigation, 139 m. The length of road, first track, actually situated in the State is 2181 m., of which 87 per cent is constructed to standard gauge. There are 13 m. of electric tramway. Some 15 m. W. of Limerick is an important land plane junction on the main trans-Atlantic air route. A thrice-daily service from Dublin is operated to the airport. Dublin airport, situated at Collinstown, 5½ m. N. of Dublin, serves the cross-Channel and European services operated by Aer Lingus (Irish Air Lines Ltd.). This company has exclusive rights on the cross-Channel services to Great Britain.

See S. Gwynn, *Ireland* (Modern World series), 1925, and *The Charm of Ireland*, 1934; Cicely Hamilton, *Modern Ireland*, 1936; T. Ireland, *Ireland, Past and Present*, 1942.

History of Ireland from the institution of the Irish Free State in 1922. (For the history of Ireland from the earliest times to 1922 see under IRELAND).—In 1921, after a year of guerilla warfare between England and Ireland, a truce was declared, followed by a treaty (Dec. 6, 1921) whereby Southern Ireland was given independence and Dominion status. The *Dail* (see DAIL EIREANN), the Parliament founded by the Irish Republicans in 1919, accepted the treaty in Jan. 1922. A provisional gov. was set up, with Michael Collins at its head, and the Irish Free State or Saorstát Eireann came into being. The elections in June were followed by civil disorders. The 'Irregulars' were eventually suppressed but Michael Collins was shot on Aug. 22, and Arthur Griffith (q.v.) first president, had died only ten days before. Griffith was succeeded as president by W. T. Cosgrave (q.v.), and T. M. Healy (q.v.) was nominated as governor-general. Republican resistance to the gov. officially ended in 1923, and, in the elections of that year, a gov. similar in temper to the previous one was returned. The constitution inaugurated by the first Dail provided that 'all powers of Government and all authority, legislative, executive and judicial, were derived from the people of Ireland,' and, secondly, that Irish (Gaelic) was to be the national language of the Irish Free State. The Dail decided that the *Oireachtas* or Irish Parliament should consist of the King and

two houses—the *Dail*, and the *Seanad* or Senate, but, with the passing of the Senate Abolition Bill, in 1935, the Senate disappeared, though, immediately afterwards, the gov. appointed a commission of inquiry into the whole question. This commission recommended the institution of some form of Second Chamber chosen by the Dail.

Proportional representation together with equal suffrage for all over twenty-one years, was introduced by the law of 1920. The Irish Free State became a member of the League of Nations in 1923. In 1928 governor-general Healy was succeeded by James McNeill. Through various parl. vicissitudes, and in spite of being without a majority after the elections of June 1927, Mr. Cosgrave remained in office till 1932, when he was succeeded as President of the executive council by Mr. Eamon de Valera (q.v.), leader of Fianna Fail. Mr. de Valera at once began an intensive Republican and anti-Brit. campaign by intimating that the Dail would proceed to pass a Bill to abolish the Oath of Allegiance to the Crown required to be taken by the deputies, and that his gov. proposed to withhold payment to the Brit. National Commissioners of the annual sum of £3,000,000 in respect of Irish land annuities and £2,000,000 in respect of pensions for the ex-Royal Irish Constabulary, Civil Pensions, Local Loan Fund Annuity, etc.—the amount of £5,000,000 being the total aggregate liability of the Irish Free State as finally agreed between the Cosgrave gov. and the Brit. Gov. some years previously. In reply to the Brit. Gov's objection that the Irish Free State constitution (Removal of Oath) Bill was a breach of the Treaty of 1921, the de Valera gov. argued that the requirement as to taking the oath as members of the *Oireachtas* was not mandatory and that in any event the Free State gov. was entitled under the Statute of Westminster (q.v.) to legislate on the Constitution as they might wish. In the result the bill was passed by the Dail but, being rejected by the Seanad, the matter was postponed.

The more acute issue throughout 1932 was that of the Land Annuities. These annuities had their origin in the various Land Purchase Acts under which the Irish tenants were enabled to purchase their holdings through loans made by the creation of land stock, and the sum of £3,000,000 was the annual payment made to the Brit. Gov. in respect of interest on the land stock and sinking fund. The de Valera Gov., however, defaulted in payment of the instalment due in the summer of 1932 and declined arbitration on the issue by a commonwealth tribunal. In order to collect the money the Brit. Gov. at once imposed tariff duties on Free State exports to the United Kingdom and the Free State retaliated with duties on United Kingdom imports. In the course of this 'economic war' the Free State Gov. initiated plans for a self-sufficient Ireland. In 1935 a Citizenship Act was passed laying down the status of an Irish Free State citizen or national. In the same year the Dail passed Bills to

abolish the Senate, and Univ. Representation. It also abolished the governor-generalship and replaced that official by a Seneschal (later replaced by a constitutionally orthodox president). When the 1937 Constitution Act was passed, E. was declared to be 'a sovereign independent democratic State.' The authority of the king of Great Britain was then only recognised 'as head of the Brit Commonwealth of Nations' for external purposes, such as the signing of Treaties and the appointment of representatives to foreign or dominion caps. Every effort is made by the gov. to promote the spread of Gaelic, but so far without much success. E., as stated above, comprises what is commonly called Southern Ireland, and though there is much agitation for the abolition of the border, the Brit. Gov. has taken its stand on the position that unity is essentially and exclusively a matter for accommodation between the two Irish Govs. and peoples. Agitation by the I.R.A. (so-called Irish Republican Army) has taken the form of bomb outrages in England and in Ireland—a campaign which was as strongly condemned in Ireland as it was in England.

On April 25, 1938, an Anglo-Irish Agreement was signed in London, under which the most outstanding differences (apart from partition) were disposed of. It was agreed—in accordance with the Treaty of 1922—to transfer the control of the coast-defence stations—one of the outstanding causes of friction being the Brit. occupation of certain ports like Berehaven, Lough Swilly, etc.—to Eire; to accept £10,000,000 from Eire in commutation of the land annuities; and to reduce or remove the special and retaliatory customs duties on Irish and Brit imports respectively.

Strenuous efforts have been made by the E. Gov. to promote the development of secondary industries in E.—notably beet sugar and industrial alcohol. But it cannot be said that secondary industries have flourished or are likely to flourish in E. to any very marked extent. With the Ger. invasion of Denmark in 1940, the demand in England for Irish dairy produce and bacon was increased; but it was evident that Irish agric. required bold measures of reorganisation before it could avail itself of such opportunities. On the outbreak of the Second World War in Sept. 1939, E. declared its neutrality, and was the sole member of the Brit. Commonwealth of Nations to remain neutral. This neutrality, in spite of many tragic examples of the fate of weak neutrals, E. was determined to preserve; and the possibility that Ireland might be exploited by Germany as a stopping-stone for invasion now became a major preoccupation in Britain's defensive plans. There were tripartite negotiations between the United Kingdom, Eire and Northern Ireland for seeking some formula which might reconcile Brit. security with Ireland's political necessities; but Mr. de Valera's insistence on the removal of Irish partition proved insurmountable and all the Brit. gov. gained was the

right to send aid if an invasion actually took place—Mr. de Valera repeating publicly, more than once, that invasion would be resisted from *whatever quarter it came*. Precautionary measures, however, included the posting of troops on the border of Ulster, and the mining both of the Irish Sea and the passage between the Orkneys and Iceland (1940). E. did not altogether escape bombing for bombs were dropped on Aug. 26, 1940, but it is probable that this was the inadvertent act of inexperienced Ger. pilots, who were off their course. The deprivation of the use by the Royal Navy of the Southern Irish ports no doubt augmented the toll of dead from Ger. U-boat attacks on merchant shipping, though this assumption is contested in Irish quarters. When Italy and Japan entered the war, there were, in Dublin, therefore, three embassies of nations hostile to Britain; but it is probable that Irish vigilance prevented any of them from being useful channels of enemy communication. With the landing of Amer. troops in Ulster, and the fortification of bases there, the chances of an enemy invasion of Ireland began to recede. Mr. de Valera's protest to America against the landing of Amer. troops on Irish soil was entirely unavailing; for neither Britain nor America would or could have dreamt of foregoing the decisive advantages of the Northern Irish bridgehead. To this and to the sure shield of the Navy, E. owed its immunity from attack in the war.

During Mr. de Valera's tenure of office E. became in all essentials an independent republic; for in the new constitution of 1937 no reference was made to the Crown. But the Constitution left in force the Eire Executive (External Relations) Act of 1936, which authorised the King to act on behalf of E. in certain matters within the field of external affairs as and when advised by the E. Executive Council to do so. This, in practice, meant that the King's authority was never invoked except in the matter of accrediting E.'s diplomatic representatives abroad. Pressed in the Dail to state whether E. was or was not a republic and whether or no it remained within the Brit. Commonwealth of Nations Mr. de Valera maintained the position that according to 'dictionary' definitions of an independent republic E. was a republic; but he evidently shrank from severing the last tenuous constitutional link or 'external association' with the Commonwealth—the rest of whose members acknowledged the common allegiance to the Crown—because of the partition issue. The existence of the border made it impossible to declare the whole of Ireland to be an independent republic *de jure*, even though the E. Constitution purported to embrace the whole is under the designation of 'Eire.' In Dec. 1937 the United Kingdom Gov. stated, after consultation with the govts. of the four dominions, that they, like those govts., were prepared to treat the new E. constitution as not effecting a fundamental alteration in the position of E. as a member of the Commonwealth.

But Mr. John A. Costello of the Fine Gael party, who became Prime Minister of a coalition gov. in Feb. 1948 after defeating Mr. de Valera's Fianna Fail Gov. at the polls, unexpectedly announced on Sept. 7 that his gov. proposed to repeal the Executive Authority (External Relations) Act and thus remove the last vestige of E.'s constitutional partnership in the Commonwealth. At the same time he declared that this was to be done in the most friendly spirit, and he repeated this assurance in the Dail (Nov. 24) and reinforced it by disclaiming any hostility to the King. Two days later the Dail gave the Republic of Ireland Bill a unanimous second reading and the Brit. Prime Minister, Mr. Attlee, accepted the spirit of goodwill in which the E. Gov. had acted and stated that after the Republic of Ireland Bill became law the United Kingdom Gov. would not treat E. as a foreign country or her citizens as foreigners.

The Republic of Ireland Act (disposing of the External Relations Act) came into operation on April 18 (1949). By this Act E. officially severed her last link with the Brit. Commonwealth of Nations. This resulted in legislative anomalies on the status of Irish citizens, but, conformably to the pledge given by Mr. Attlee, the Ireland Bill, introduced in the Commons soon afterwards, removes these anomalies by recognising the secession of E. from dominion status (*q.v.*) and confirming citizens of the new republic in all the rights which they held in the United Kingdom while E. was still a member of the Commonwealth. The Bill also proposed to give statutory authority to assurances to N. Ireland concerning her constitutional position and territorial integrity. The severance of the Crown link implied no real or material change in the position which had been accepted for the previous 12 years and even before Mr. Costello's gov.'s new move was taken, the highly individual status of E. was exercising the ingenuity of lawyers. Thus the new Brit. Nationality Act, which came into force in Jan. 1949, had to ensure that, while E. citizens should not be Brit. subjects, they should continue to be treated in the same way as Brit. subjects and not be called aliens. The attempt to smooth over possible difficulties was dictated by mutual interest; for Britain has a large Irish population in every walk of life and E. has a serious emigration problem that, since America and the dominions offer less easy openings than formerly, can only be solved in Britain; and in any case the introduction of passports and registration would impose an intolerable strain on both sides.

Bibliography: W. O'Brien, *The Irish Revolution*, 1923; P. S. O'Hegarty, *The Victory of Sinn Féin: How it won it and how it used it* (Dublin), 1924 (a record of impressions); S. Gwynn, *Ireland*, 1924, (a balanced survey, with historical references, of the forces which were moulding the life of Ireland at this time); Sir J. O'Connor (one time Lord Justice of Appeal in Ireland), *History of Ireland, 1793-1924* (2

vols.), 1925 (a hist. from the Union to the Treaty of 1921 which purports to sum up fairly and with detachment, the case of Ireland versus England and the cross-case of England versus Ireland, it being conceded that 'there are well-founded complaints on both sides'); W. Alison Phillips (Lecky Prof. of Modern History, Dublin Univ.), *The Revolution in Ireland, 1906-1923*, 1926 (reproduction, mainly of hist. pub. in the 12th ed. of the *Ency. Brit.*, excluding the concluding chapters on the creation of the Irish Free State); D. Gwynn, *The Irish Free State, 1922-1927*, 1928 (survey of the work of reorganisation and reconstruction in the early years of the development of the Irish Free State, in the light of Dail debates, Irish newspapers, departmental reports and the evidence given before Commissions of Enquiry); Earl of Middleton, *Ireland—Dupe or Heroine*, 1932 (a defence of Brit. policy during the period when Arthur Balfour was mainly responsible for it); R. Pakenham, *Peace by Ordeal*, 1935 (on the negotiation of the Anglo-Irish Treaty of 1921); E. Curtis, *A History of Ireland*, 1936 (a hist. of the struggle for political unity and nationhood, cultural, social and economic factors being given their due weight with the major influences of politics and religion); Dorothy Macardie, *The Irish Republic*, 1937 (a documented chronicle of the Anglo-Irish Conflict and the partition of Ireland, with a detailed account of the period 1916-1923) (with a preface by E. de Valera); H. Harrison, *Ireland and the British Empire, Conflict or Collaboration?* 1937 (a study of Anglo-Irish differences from the international standpoint); D. O'Sullivan (Clerk of the Senate), *The Irish Free State and its Senate: a study in Contemporary Politics*, 1940 (a documented record combining the hist. of the Second Chamber and of the Irish Free State); N. Mansergh, *Ireland in the Age of Reform and Revolution*, 1940 (deals with the hist. of nineteenth-century Ireland from 1840-1921); and *Britain and Ireland*, 1942 (a pamphlet on the story of Ireland from the earliest times to the advent of Sinn Féin, followed by chapters on dominion status, the Irish Free State under the Fianna Fail party and the gov. of Ulster); M. McDunphy, *The President of Ireland: His Powers, Functions and Duties* (Dublin), 1945; Sir S. Leslie, *The Irish Tangle*, 1946 (deals with the partition problem and present-day Anglo-Irish relations generally, Ireland's neutrality in the world war, etc.).

For the physical features, etc., of Ireland, see under IRELAND.

Eisenach, tn. in Thuringia, Germany, is beautifully situated on the edge of the Thuringian forest. The mineral waters from Kreuzburg attract many invalids (8500 in 1927). There are sev. churches of the early thirteenth century, the tn. hall (1508, rebuilt 1638) and the castle of the former grand duke in which is now a picture gallery. In the Karls Platz in the centre of the tn. stands a statue of Martin Luther, who attended the Latin school in the tn. from 1498 to 1501. E. is noted for the manuf. of motor-cars, dyes,

agric. machines, chemicals, and electrical articles. There are many educational establs. and museums, one on the Wartburg, where Martin Luther, too, passed some years in this tn., and the chapel in which he preached is still in existence. The tn. dates back to about 1065, and was founded by the landgrave of Thuringia; later it passed into the hands of a Saxon family, and finally in 1711 it became the property of the duchy of Saxe-Weimar. It contains the Klemda, a castle built about 1260, a ducal palace, built in 1742, a tn. hall, and the late Gothic Georgenkirche. Pop. 52,800.

Eisenberg, tn. in Thuringia, Germany, with a pop. of 11,300 and the anct. castle of Christiansburg, which is used as the tn. hall.

Eisenerz, tn. in the Austrian prov. of Styria, in the Erzberg Mts., which is famous for its iron mines. Pop. 10,000.

Eisenhower, Dwight David (b. 1890) Amer. soldier, son of David J. Eisenhower of Swiss forbears who came to America before the Amer. Revolution, born at Abilene, Kansas, where he spent his boyhood. Graduated from West Point in



Press Portrait Bureau

DWIGHT DAVID EISENHOWER

1915. In the First World War he was chiefly engaged in training troops of the tanks corps at home and his promotion up to a point, was not rapid, his rank at the opening of the Second World War being still lieutenant-colonel; but by 1942 he was one of America's seventeen lieutenant-generals and thereafter was advanced more rapidly than any other Amer. officer, his outstanding qualities being quickly discovered by Gen. Marshall (q.v.). In Feb. 1942 he became chief of the plans div., War Department, General Staff. In Feb. 1943 he was appointed temporary general. In the following June he was appointed commanding general European Theatre of

Operations and from that post proceeded to N. Africa. After the expulsion of the Axis forces from Tunisia and Sicily he was appointed supreme commander of the Allied forces and worked on the plans for the launching of the 'Second Front': the success of the landings and ensuing battle of Normandy owed much to his organising abilities. For more than a quarter of a century E. had been an inspired student of mechanised warfare and in large-scale manœuvres in America he showed remarkable originality in his direction of this type of combat. In 1922 he was assigned to the Amer. Battle Monuments Commission and went to France to compile a guide-book of the Amer. battlefields there—a useful study in view of his destined appointment in 1944. Later at the Fort Leavenworth Command and General Staff School E. finished first. He was a moving force in the estab. of the Army Industrial College while he worked in Washington on plans for war mobilisation. In 1935 he went to the Philippines as assistant military adviser to the commonwealth under Gen. MacArthur and for the ensuing five years played a major role in devising the defences of the is. In the *Report by the Supreme Commander to the Combined Chiefs of Staff on the Operations in Europe of the Allied Expeditionary Force 6 June 1944, to 8 May 1945* (H.M.S.O. 1946) is told the story of the planning, courage, work and final results of the operations in Europe. Through the whole report is to be detected Gen. E.'s impression of complete allied unity, though, towards the Brit. Chiefs of Staff in London he often felt impatience, chiefly because they 'regularly queried their commanders in the field concerning tactical plans' (*Crusade in Europe*). He indicates that three episodes were the most decisive in ensuring victory—the Battles at the Normandy beaches, the Falaise pocket, and those W. of the Rhine in February and March 1945. 'Victory was won,' he states, 'before the Rhine was crossed.' The king conferred on E. the O.M. at Buckingham Palace on June 12, 1945. He retired from the U.S. Army in 1948 after thirty-three years' service, and in the same year became president of Columbia Univ., New York. See his *Crusade in Europe*, 1949; and K. S. Davis, *Soldier of Democracy*, 1945; H. C. Butcher, *My Three Years with Eisenhower*, 1946.

Eisenstadt, cap. of the Austrian prov. of Burgenland, noted for its magnificent seventeenth century castle, Schloss Esterhazy. Pop. 6000.

Eisenstein, Sergei (1898–1948), Russian film director b. at Riga. Set the task, after the Russian Revolution, of founding a school of cinema, he rivalled in a short time the Amer., Ger., and Fr. His best work which made him one of the world's greatest masters of film technique, was achieved with the silent films *Battleship Potemkin* (1925) and *October: Ten Days that shook the World* (1927). Later films were *Alexander Nevsky* (1938) and *Ivan the Terrible* (1943).

Eisleben, tn. of Saxony, Germany, 24 m. from Halle, the bp. of Martin Luther. The

house in which he was born has been a museum since 1917. Both that and the house in which he died are in the Altstadt or old tn. The churches include the Andreaskirche, with the pulpit in which Luther preached, the fifteenth-century church of Peter and Paul, with the chapel in which he was baptised, the Nicholas Church, 1426, and the Anna Church, 1514. The tn. hall is of the date 1519-30. Besides the mining of copper and silver, there is a trade in seeds. Pop. 24,000, mostly Protestants.

Eisner, Kurt (1868-1919), Ger. journalist and statesman of Jewish descent, b. at Berlin. Wrote voluminously on art, the drama and sociology. Won a high reputation at the Berlin Gymnasium in philosophy and Germanic studies, and early in life wrote an excellent treatise on Nietzsche. Wrote for the *Frankfurter Zeitung* in 1892 onwards, and for his socialist opinions was sentenced to a term of 9 months' imprisonment in 1897. Subsequently co-operated with Wilhelm Liebknecht in the editorship of *Vorwärts*. Organised a bloodless democratic revolution in Bavaria towards the close of the 1914-18 War, becoming Premier after the abdication of King Ludwig, but was murdered by Spartacist soldiers early in 1919. He prophesied the first World War in his Morocco treatise, *The Sultan of the World War*. See A. Got, *La Terreur en Bavière*, 1922.

Eisteddfod (plur. eisteddfodau), congress of Welsh bards, was instituted in order to encourage the composition and preservation of national poetry and music. Its origin dates back to very early times, and an E. was held at Caerwys, in Flintshire, about the beginning of the twelfth century. It was first sanctioned in England after the annexation of Wales, and there are records of eisteddfodau having been held in the reigns of Edward III., Henry VI., Henry VIII., and Elizabeth. The festival then seems to have been discontinued, but was again revived in 1789. It is held annually, in a different tn. each year. Its celebration generally occupies three or four days, and a president and conductor are appointed for each day. There are competitions in poetry, music, singing both choral and solo, as well as singing with the harp; there are also art competitions. The third day is the chair day, when the fortunate winner is proclaimed.

Eistat, see EICHSTAT.

Elvishtal, see EINFISCHTAL.

Ejectments, see RECOVERY OF LAND.

Ejectors, see under PUMPS.

Ekaterinburg, see SVERDLOVSK.

Ekaterinodar, see KRASNODAR.

Ekaterinoslav, or **Yekaterinoslav**, see DNIÉPROPÉTROVSK.

Ekhmim, or **Ikhmim**, see AKHMIM.

Ekim, see EGIN.

Eklogite, see ECOLOGITE.

Ekowe, see ESHOWE.

Ekron, city of the Philistines on the borders of Judah and Dan, where Beelzebub was worshipped. It was the place from which the Ark of the Covenant, which had been captured by the Askalonites, was returned to Israel. At a later period it became part of the ter. ruled by the Maccabees. E. was one of the five allied cities (the others being Gaza, Ascalon, Ashdod, and Gath) of the 'Peleshim' or Philistines (1 Sam. v., vii., xvii.; 2 Kings, i. and Zeph., ii., and Zech. xvi.). Its modern name is Aqir. Its present inhabs. number about 1200, and in its neighbourhood is a Jewish agric. settlement founded by Baron Rothschild.

El Aazariyeh, see BETHANY.

Elabuga, tn. of the Sverdlovsk Ilegion of the R.S.F.S.R., situated on the Kama R. It has flour mills and exports corn. In 1858 the celebrated 'Ananiyskiy Mogilnik' (burial-place) was discovered 3 m. from this tn.

Elæagnus, see OLEASTER.

Elæocarpus, genus of Elæocarpaceæ. *E. serratus* bears an olive-like fruit used by the natives of India as an ingredient of their curries; *E. cyaneus* has white flowers and is one of the most ornamental of Australian plants.

Elæococca, genus of Euphorbiaceæ. The seeds yield valuable oil. *E. verrucosa* of Japan produces seeds supplying oil for burning, and *E. vernicia* of China furnishes oil used for painting.

Elæodendron, genus of Celastraceæ, occurs in all tropical countries, and is divided into 30 species. *E. glaucum* is a small tree about 14 ft. in height; it is a native of Ceylon and Coromandel and has been introduced into Britain as Ceylon tea. *E. Roxburghii* grows in the mts. of India, and *E. orientale* is found in Madagascar.

Elæolite, crystalline plutonic rock composed largely of nepheline and alkali felspar. It resembles granite in appearance, and is of a pale grey or pink colour; green is also found. It does not contain quartz, but is rich in many other minerals which contain alkalis.

Elagabalus, or **Heliogabalus**, emperor of Rome (A.D. 218-222), was b. at Emesa. A.D. 205, and was then called Varius Avitus Bassianus. When very young however, he became priest of E., the sun god, and so obtained this name. In A.D. 218 E. was proclaimed emperor as the successor of Caracalla, and was successful in overcoming Macrinus, who had murdered Caracalla and had occupied the throne for a short time. His reign, which lasted over three years, was characterised by the most unheard-of excesses, and he was eventually murdered by the prætorians.

El Alamein, Battle of, see under AFRICA, NORTH, SECOND WORLD WAR CAMPAIGNS IN.

Elam, anct. name for that part of the land which lies E. of the lower course of the R. Tigris. Susiana (from the name of Susa, its prin. city) was the name given in classical hist. to the S. portion of this land, the modern name of which is Khuzistan. This portion was called by the Gks. Elymais.

Elan, riv. of Wales. It flows through Cardiganshire and Radnorshire, joining the Wye S. of Rhayader. A dam has

been constructed on this riv. for the purpose of forming a reservoir which supplies the city of Birmingham with water.

Eland, popular name of a genus of large and almost exclusively African antelopes, characterised by the general absence of horns in the females and by those of the male being devoid of rings, angulated in front, and usually spirally twisted. Both sexes have a large dewlap, and the crowns of the upper molar teeth are low and broad. The common E., *Orias canna*, formerly ranged over the greater part of S., E., and Central Africa, but is now extinct in the S. of the continent. Its complete extirpation is probably only a matter of time, the animal being frequently slaughtered for its hide. The magnificent species known as the Derbian E., *O. derbianus*, replaces the common species on the W. coast in the dists. of Angola and Senegambia.

Elandslaagte, vill. of Natal, S. Africa, 16 m. from Ladysmith, scene of a Brit. victory over the Boers on Oct. 21, 1899, early in the S. African war.

Elanet, or **Elanus**, genus of Falconide closely allied to the kites, found in all the continents. *E. caerulus*, the black-winged kite, is common to Africa and Asia, and is occasionally seen in Europe. *E. scriptus* belongs to Australia; *E. dispar*, the black-shouldered hawk, occurs in America. All are birds of prey and some will eat even insects.

Elaps, see CORAL SNAKES.

El Arish, see ARISH.

E.L.A.S. (Gk. Ellinikos Laikos Apelevtherotikos Stratos) a Gk. national popular liberation army of the left in the Second World War, originally a section of E.A.M. (q.v.).

Elasmobranch. The Elasmobranchii are an order of fishes marked by the cartilaginous nature of the bones and by the absence of sutures in the cranium. Such are the shark, ray, sturgeon, skate, etc., and a number of more or less allied extinct forms. They appear in the Upper Silurian epoch, and as they are the oldest fishes with which we are acquainted, it is probable they may have been the stock from which all fishes were derived. A Jap. shark, *Chlamydoselachus*, is said to be the oldest living fish. All the existing members of the order are carnivorous, but whereas the tropical shark is highly predaceous, some of the largest species have very small teeth and feed on molluscs and other invertebrates. The Elasmobranchii are marine fishes, but many ascend tidal rivers.

Elasmosaurus, gigantic fossil reptile belonging to a family allied to the Plesiosauroidea. It is found in the Upper Cretaceous rocks in Kansas, and its computed length is 45 ft.

Elasticity. A substance is said to be elastic when, on being left free, it recovers wholly or partially from a deformation. A very general proof of compressibility and of E. of bulk is afforded by the fact that the great majority of bodies are capable of transmitting sound-waves, for the propagation of sound consists essentially in the handing on by resilience, from

layer to layer of the medium, of a state of compression or dilatation. All ordinary sounds are propagated in air; the rate of passage of sound has been measured in the waters of the lake of Geneva and elsewhere, and it is a matter of common observation that sound can be transmitted through solid bodies, such as a wall or a floor. The one kind of elastic deformation which can be experienced by a fluid, i.e. a gas or a liquid, is change of bulk. This change of bulk can only be brought about by a pressure acting equally in all directions. The E. in these cases is the ratio of the change of pressure to the change of vol. per unit volume. A change of vol. of a gas is accompanied by an evolution or an absorption of heat, which is usually shown by a rise or a fall of temp. It is sufficient to state here that there will be two values for the E. of a gas, according as the change takes place without loss or gain of heat or without change of temp. In the latter case, the E. is numerically equal to the pressure, if the gas obeys Boyle's law. The ratio of the E. when heat is neither gained nor lost to the E. at constant temp., is equal to the ratio of the specific heat of the gas at constant pressure to the specific heat at constant vol. The change of vol. which can be produced in a liquid by pressure is very small, being about 5 parts per 100,000 for one atmosphere change of pressure. The E., according to the above definition is, therefore, very high. When we pass to the consideration of solids, we are met with another kind of E., the E. of form. The processes of manufacturing many articles show clearly that it is possible to bring about changes of form from which the body does not recover on removal of the forces. The moulding of clay in pottery work, and the forging, stamping, and wire drawing of materials are familiar instances of such effects. On the other hand, the recovery of form and shape is used, very frequently, in such cases as hair-springs of watches, spring balances, carriage springs, buffers, and so on. These examples show clearly that there is an elastic limit within which bodies will recover their form and shape, and beyond which they will be permanently changed. Two terms, strain and stress, which are frequently used in E., may be defined as follows: Any alteration in form or bulk of a body is called a strain, and the combination of forces producing a strain is called a stress. The resistance which a solid offers to a pure change of form is measured by its rigidity, and if for this change the body is truly elastic, the rigidity is measured by the ratio of the deforming stress to the resulting strain. A pure twist applied to a rod or wire involves no change of vol. The resistance which such a rod offers to a change of form depends on its rigidity and form, and is independent of its compressibility. But in most cases, where a body is strained by a particular form of stress, the ratio of the stress to the strain involves both the rigidity and the compressibility. Thus, when a wire is stretched by applying a tension parallel to its length, it increases

in length but diminishes in thickness. If the ratio of the stretching force per unit area of cross section to the increase in length per unit length be called E , then $E = \frac{1}{9k} + \frac{1}{3n}$ (where k = bulk, modulus = ratio of a hydrostatic pressure to the change in vol. per unit vol. of the solid produced by that pressure, and n = the rigidity), and the ratio percentage lateral contraction = σ (or percentage elongation

Poisson's ratio) is equal to $\frac{3k-2n}{6k+2n}$. Thus the quantity E , which is called Young's modulus, is not an independent quantity. Young's modulus is of importance in engineering, for it determines not only the contraction which will be produced in a pillar by a given load, but also the resistance which a beam or a bar offers to bending (see STRENGTH OF MATERIALS). It has already been stated that there is a certain limit of strain called the elastic limit, beyond which a permanent strain or set will be produced in a body. The limits of perfect E are very low—if they exist at all—for glasses and other hard, brittle solids; but metallic substances, such as copper, iron, platinum, brass, and steel, are very nearly perfectly elastic as regards distortion, provided the distortion is not too great. The exact

EXTENSION

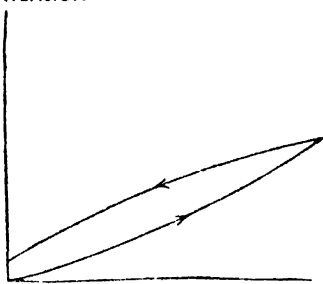


FIG. 1

value of these limits is somewhat indefinite, for a small stress acting for a long time will produce a permanent change of form, which could only be produced in a short time by a very much larger stress. But within the elastic limit, and with stresses applied for a short time, experiment shows that the stresses are proportional to the strains. This relation was stated in 1678 by Robert Hooke, in the form *Ut tensio sic vis*. Applying Hooke's law to the case of a stretched wire, it follows that the extension is proportional to the stretching force over a considerable range of values. Even within the elastic limit, Hooke's law is not accurately true, although the divergences are not great.

It will be seen from Fig. 1 that the extension produced in a wire by a given load depends on the way in which the given load is obtained, whether by increasing or decreasing a former load. It is also seen that the wire is slightly longer at the end of the experiment than it was at the beginning. Similarly, if a rod is subjected to torsion, the twist produced by a given couple will depend on the previous treatment of the rod. When a cyclic state has been estab., the relation between the couple and the twist is that shown in Fig. 2. It is seen that the twist lags behind the couple. Thus, as we pass from B to B₁, the couple vanishes at C, but the

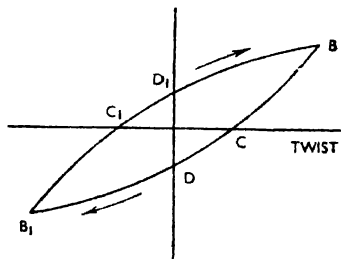


FIG. 2

twist does not vanish till we reach D. The lagging of the effect (in this case the twist) behind the cause (the couple) has been called hysteresis by Ewing. The area enclosed by the curve B'D'BDB₁ is proportional to the energy dissipated in each cycle.

When rubber and certain synthetic materials are subjected to stresses their behaviour differs from that of most other substances in that, even after considerable deformations have been produced, rubber and rubber-like materials revert to nearly their initial form when the stress is removed. The common feature of all such elastomers is that they are built up of molecules each of which has a long chain of atoms. These molecular chains have relatively few or weak links with neighbouring chains, and in the unstretched material most of the chains are coiled back irregularly upon themselves like the strands of a tangled skein of wool. When a stress is applied the chains are straightened out, and arrange themselves more nearly parallel to one another. Atoms are continuously in vibration, however, and the result of this is that, when the stretching force is removed, the chains tend to revert to their coiled up configuration, and the material spontaneously retracts to its original length. Many naturally occurring fibrous materials such as silk, collagen (the material from which leather is made), and wool, also have long chain molecules. They do not, under normal circumstances, exhibit long range elasticity of the same order as rubber because the links joining neighbouring

chains are more numerous and prevent the chains becoming randomly bent, but the stretchiness of wool is due to a straightening out of the atom chains, as is also that of muscle fibres. See A. E. H. Love, *A Treatise on the Mathematical Theory of Elasticity*, 1927; R. Houwink, *Elasticity, Plasticity, and Structure of Matter*, 1937; R. V. Southwell, *An Introduction to the Theory of Elasticity for Engineers and Physicists*, 1942.

Elastin and Elastic Fibre, see TISSUE.

Elatea (the modern Drachmani) was in ant. times the largest tn. in Phocis, Greece. It was not far from Cephissus, whilst one of the chief passes from Thessaly to Boeotia was near at hand. Once it was famous for a temple to Æsculapius, and ruins of one dedicated to Athena Cranea were unearthed here in 1883. In the course of his subjugation of Greece, Philip of Macedon captured the city in 338 B.C.

Elatér Beetle, see CLICK BEETLES.

Elatéridæ, name given to a family of Coleoptera commonly known as click-beetles, glow-worms, fireflies. (q.v.).

Elatérin, active principle of elaterium. It is a chemical substance, its formula being $C_{20}H_{30}O_8$. It is extracted, by means of boiling alcohol, from the juice of *Ecballium agreste* in the form of colourless hexagonal crystals which are insoluble in water. Elaterium is a vegetable extract obtained from *Ecballium elaterium*, a perennial tropical plant. It is very bitter, and a powerful purgative. It is also used as a remedy for dropsy and cardiac diseases.

Elatérite, an elastic bitumen. It is blackish-brown in colour, translucent, and is found in soft, sticky masses in Derbyshire, near Edinburgh, and in Fifeshire. It is sometimes called mineral caoutchouc, and is very much like India-rubber.

Elatinacæ, dicotyledonous order, contains about thirty shrubby or herbaceous species found in marshy places and under water in tropical and temperate parts of the globe. *E. hydropiper*, the water-pepper, grows under water in France and sometimes in Britain.

Elba (known as *Albania* to the Gks., and 'Illa' to the Roms.), an is. 18 m. long, in the Mediterranean Sea, lying some 6 m. from the mainland of Italy, and forming part of the prov. of Livorno, from which it is separated by the gulf of Piombino. Monte Capane, its highest peak, attains an altitude of 2925 ft., but the whole is. is mountainous. Mining is the chief industry, the mines near Rio Inferiore yielding excellent hematite and other iron ore. Marble, lead, sulphur, and alabaster are also exported. Olives, the vine, and wheat are grown, but agric. is backward. Porto Ferrajo is the cap. E. is best known as the realm which the deposed emperor Napoleon ruled from May 3, 1814, until Feb. 26, 1815. Pop. 29,500. In the Second World War E. was taken by French forces on June 19, 1944.

Elbasan, tn. of Albania, in the prefecture of the same name, on the r. b. of the R. Shkumbin, with numerous mosques, in a fertile plain. Olives and maize are

cultivated. Pop. about 13,700 of whom 85 per cent are Moslems. E. was captured by the Serbs during the Balkan wars but was returned to Albania. In the Second World War in the fighting against the Its. (who had seized Albania before the war) the Gks. advanced on E. in Dec. 1940. The tn. was bombarded by the R.A.F. in Jan. 1941, but the Ger. advance from the N. in Greece prevented further operations against E.

Elbe (the 'Albis' of the Latins and the 'Labe' of the Czechs), the riv. next in importance to the Rhine in Germany. The area of its drainage basin is estimated at 56,000 sq. m., whilst its total length is 525 m. Ocean vessels can sail up as far as Hamburg (84 m. from the mouth), and the riv. is navigable for a distance of 525 m., that is up to the confluence of the Moldau, at Melnik. It is distributed chiefly over Bohemia (190 m.), Saxony (77 m.), Prussia (350 m.), and Hamburg (108 m.). The E. rises, at an altitude of 4600 ft., on the S. slopes of the Kieseengebirge in Bohemia. At first it flows S., then N. and N.W. Above Brandeis it is joined by the Iser, whilst at Melnik the Moldau more than doubles its volume. At Leitmeritz the Eger reddens its waters, and soon, after piercing the basaltic Mittelgebirge and passing the beautiful Saxon 'Alps' of the Elbsandsteingebirge, it oversteps the Bohemian frontier, flows past Dresden and Meissen, and begins, in a N.W. direction, its long course over the N. Ger. plain. Leaving behind on its banks the tns. of Torgau, Wittenburg, Magdeburg, Hamburg, and Altona, and swollen with the waters of the Mulde and Saale from the left, and the Havel and Elde from the right, it finally reaches the N. Sea at Cuxhaven. The two streams, the Norder and Süder E., which separate above Hamburg, are reunited at Blankenese. At Kolín the width is 100 ft., at Dresden 960 ft., whilst near the estuary it varies from 4 m. to 9 m. Since 1871 rapid improvements, including harbours, docks, etc., and numerous canals, have been made in the E. navigation, although inundations continue at times to retard its progress. The E., Reek, Rudersdorfer-Gewässer, Rheinsberger, and Sacrow-Paretzer Canals have effectually joined up the E. and Oder systems, whilst the Elbe-Trave Canal (42 m.) of 1900 has opened up direct communication between Lübeck and the E. A great deal of timber is floated down the riv., and the goods traffic, which is greater than on any other Ger. riv. is carried on by steamers and barges, which are partly hauled by the towing chain fastened in the riv. bed between Hamburg and Aussig. Passenger boats are mostly confined to Saxony and Bohemia. The many international changes resulting from the First World War, and especially the recognition of Czechoslovakia as a separate nation, gave a new political importance to the Elbe, which, according to the treaty of Versailles, was now declared to be an international riv. from its union with the Vltava, under a committee on which Germany, Czechoslovakia, Britain, France,

Italy, and Belgium were represented. Commercially, however, the E. has lost much of its heavier traffic of recent years, owing to the amalgamations of Ger. railways. In the operations on the W. Front in 1945 Gen. Bradley, Amer. general commanding the Central Group of Armies, was directed by Gen. Eisenhower (q.v.) in April to seize any opportunity of capturing a bridgehead over the E. and to be prepared for operations farther E.; but it was anticipated that these would be unnecessary, as the speed of the Russian advance from the E. would probably lead to a junction with them over the E., if not W. of the riv. The Amer. Ninth Army reached the E. S. of Magdeburg, on April 11 and crossed the riv. the next day. A second bridgehead S. of Wittenberg, was achieved by the Fifth Armoured Div. of XIII. Corps, on April 13. On April 14 the Third Armoured Div. of VII. Corps reached Dessau, immediately S. of the confluence of the Mulde and Elbe rivs. On April 21 Brit. troops, who had won a bridgehead a few days previously, expanded their hold and crossed the riv. near Lauenburg, S.E. of Hamburg on April 29. On the 25th Amer. patrols of the 69th div., which had probed eastward from the Mulde, met elements of the Russian 58th Guards div. in the Torgau area on the riv. The junction of the E. and W. Fronts had been effected on the riv. and Germany was cut in two. Thus the object of the central thrust under Gen. Bradley, had been achieved. While the Amer. forces in the centre were halted on the E. and Mulde other forces turned to the completion of the operations in the N. and, accordingly, in the N. sector 21st Army Group was directed to seize other crossings over the E. in the British Second Army zone, secure Hamburg and advance at speed on the general area of Kiel-Lubeck. On May 2 Brit. forces crossed the E. again and turned down its r. b. toward Hamburg which surrendered to the 7th Armoured div. on May 3. *See further under EASTERN FRONT or RUSSO-GERMAN CAMPAIGN IN THE SECOND WORLD WAR, and WESTERN FRONT IN THE SECOND WORLD WAR.*

Elberfeld, or Wuppertal-Elberfeld, tn. in the Rhineland, Germany, adjoining Barmen, with which it is now really merged under the common name of Wuppertal, and before the Second World War an important industrial centre of the Ruhr dist. For 9 m. along either bank of the Wupper, on which E. stands, there stretched an endless line of factories, warehouses, etc. It is the noted chief centre in Germany of textile manufs. and haberdashery, and known for its production of carpets, tailors' articles, hats and caps, machines, enamel work, lead wares, tools, and paper-dyes, and fine chemicals, rubber goods, wall papers and stained glass. The municipal museum of fine and applied arts is in the old tn. hall, severely damaged in the Second World War. The new tn. hall has a tower 243 ft. high. The tn. is surrounded by grounds and promenades. E. was frequently bombed by the R.A.F. in the

Second World War. In the intensified attacks of 1944-45 the industrial centres were badly damaged, and in part destroyed. Finally, the tn. fell to the Amer. armies when they encircled the Ruhr region in 1945. *See also under RUHR.* Pop. (Wuppertal) 410,000.

Elberton, tn. of Elbert co., 100 m. E. by N. of Atlanta, Georgia, U.S.A. It produces cotton, grain, peaches, alfalfa, and manufs., cotton drills, cotton-seed oil and artificial silk. Pop. 6100.

Elbeuf, important woollen manuf. tn., 14 m. S. by W. of Rouen by rail, on the l. b. of the Seine, in the dept. Seine-Inférieure, France. In the process of crossing the Seine the allies encountered stiffening resistance as they advanced in the neighbourhood of E. (Aug. 1944), and it was at E. itself that the enemy made a desperate stand to guard the last ferries as the remainder of his beaten army streamed across the riv. But it was captured on Aug. 25. Pop. 15,900.

El Bika, *see* COELE-SYRIA.

Elbing, *see* ELBLAG.

Elblag (formerly **Elbing**), seaport of the navigable Elblag riv., 72 m. S.W. of Kaliningrad (formerly Königsberg) by rail. Once a port of E. Prussia it is now part of Poland. The Kratochvil Canal connects the E. with the Nogat arm of the Vistula, whilst the riv. joins Lake Drausen with the Frisches Haff, which is 5 m. to the N. Founded in the thirteenth century by settlers from Bremen and Lubeck, and a member of the Hanseatic League, the old inner tn. before the Second World War possessed numerous gable houses of the fifteenth to the eighteenth century, the Protestant Mary church begun in 1246, the Holy Ghost church of the thirteenth century, with the Holy Ghost hospital, the St. George's Chapel (fourteenth century), and remains of the old fortifications. In the newer quarters important industries, before the defeat of Germany in 1945, included shipbuilding, locomotive machines and turbines, automobiles, motor ploughs, tractors, etc., also aeroplane parts and other articles including chocolate and organs. Its pre-war pop. was 75,000. This once populous city fell to the Russian forces in 1945, and was reduced almost to a heap of ruins, and indeed it remained so as late as 1949. Pop. (1940) 85,900. *See further under EAST PRUSSIA.*

Elbogen (Czech **Loket**), picturesquely situated tn. in N.W. Bohemia, Czechoslovakia, near Carlsbad (Karlovy Vary). It has a large porcelain factory and a fine old castle, which was vainly besieged by the Russians in 1127. Pop. 4000.

El Bostan, *see* ALBISTAN.

Elbow, *see* ARM.

Elbruz, or Elbrooz, highest mt. in the Caucasus range, its W. peak attaining an elevation of 18,470 ft. The other summit, which was reached for the first time in 1868 by Freshfield, is 18,347 ft. above sea-level. It is an extinct volcano, whose glaciers cover 46 sq. m. The Baksan glacier extends down to a distance of 7350 ft. above the sea. *See R. L. G. Irving, Ten Great Mountains*, 1940.

Elburz Mountains, lofty range in the N. of Persia, trending from within 20 m. to 50 m. of the Caspian Sea, right across to N.E. Khorassan, thus covering a distance of some 650 m. The E. M. may conveniently be considered in three sections. The first reaches with a N. to S. direction for 120 m. from Lenkoran, being known as the Talish range. Sev. peaks attain an elevation of 10,000 ft. The second section stretches for 240 m. with a direction N.W. to S.E. from near Resht to a point beyond Mt. Demavend, the crowning summit of the whole chain (19,400 ft.) which rises E. of Teheran. There are great heights in the Talikan range, N.W. of Teheran, whilst between Talikan and Demavend are over seven ranges with an average elevation of some 12,800 ft. The Safid Rnd., by whose banks passes the great trade route between the Caspian and Inner Persia, and the Heriaz, cut their way through this section. The chief ranges of the third section (290 m. long) strike S.W. to N.E. and extend as far as N. Afghanistan, rising often over 10,000 ft. above sea-level. The N. slopes form the main watershed. Here are plentiful forests and natural vegetation, and in the valleys fertile lands, gardens, and orchards. Endless stretches of barren ridges and arid wastes disfigure the scenery S. of the watershed.

El Capitan, granite peak, 3300 ft. high, in the Yosemite valley, on the W. slope of the Sierra Nevada, in California, U.S.A.

El Centro, city of S. California, co. seat of Imperial co., in the midst of Imperial Valley, which irrigation has transformed from desert into fertile farmland. Some crop is harvested every month. Pop. 10,000.

Elche, tn. S.W. of Alicante, Spain, on the railway joining Alicante and Murcia. The surrounding grove of almost 100,000 date-palms provides all Spain with leaves for Palm Sunday and absorbs all the summer waters of the R. Vinalopo. It has a fine and lofty domed church, and the only mystery play in Spain is performed on Aug. 13 and 14 each year. Pop. 33,000.

Elchingen, or Oberelchingen, vil. 5 m. N.E. of Ulm., close to the Danube in Bavaria, Germany. Marshal Ney became duke of E. because in 1805 he here defeated the Austrians.

Elcho Challenge Shield, see under BISLEY.

Elder. The O. T. E. was only the successor of what had existed in all anc. countries, and in all primitive communities where age was always looked up to with respect and called upon to rule and judge. Moses chose seventy Es. to assist and share with him the burden of responsibility in the Wilderness, and from this evolved the Sanhedrin, the court that condemned Jesus Christ. N. T. E. or bishop, which in Gk. means the same, is an ordained office-bearer in the church. The session of a Presbyterian church is composed of Es., preaching and ruling. The preaching E. is the minister, who is ordained and inducted by the Presbytery and is the moderator of the congregational

session. The ruling Es. are elected for life by the congregation, and are ordained and inducted by the moderator of the session. In some Amer. branches of the Presbyterian Church the Es. are only elected for a certain number of years. The session has the spiritual gov. of the congregation in its hands, and only through it can members of the congregation appeal to a higher court of the church. When John Knox set up the Presbyterian gov. in Scotland he meant the ruling Es. to be salaried office-bearers and thought that they should be elected annually. However, the alienation of the church funds from ecclesiastical to secular holders prevented his idea from being carried into effect. An E. should, in the words of Paul (1 Tim. iii. 2), 'be blameless, the husband of one wife, vigilant, sober, of good behaviour, given to hospitality, apt to teach.' The courts of the Presbyterian Church are entirely made up of Es., preaching and ruling, e.g. the congregational session, one preaching E. and one ruling E. for about every twenty members. Presbytery and Synod, generally one preaching and one ruling E. from each congregation. General Assembly, a certain number of each from each Presbytery within its gov. Thus the Presbyterian Church claims apostolic authority for its church gov.

Elder, or *Sambucus*, genus of the natural order Caprifoliaceae. The species are widely distributed, deciduous shrubs. *S. nigra*, the common elder, or the bourtree of Scotland, is found in many parts of Europe. It grows quickly, to almost any kind of soil, to a height of about 20 ft. The wood of the stem is hard and when polished is used for making fishing-rods, toys, and combs. The flowers contain oil, and the berries are used for making wine. It was formerly highly valued for its medicinal properties and used as a cathartic. There are sev. horticultural varieties, the most beautiful being the *S. racemosa*, the scarlet berried E.

Elderberry Wine, made by fermenting elderberries, which usually ripen in the early autumn. It was an old household cure for coughs, and is now often used for the adulteration of port wine. The *Sambucus canadensis*, a species very common in Canada and the U.S.A., produces a prolific crop of berries, and a great quantity of wine is made therefrom.

Eldon, John Scott, first Earl of (1751-1838), Eng. lawyer, and statesman, b. at Newcastle, almost blighted his prospects by making a runaway marriage as soon as he had won his fellowship at Univ. College, Oxford. However, he was called to the Bar in 1776, and from that time success smiled on him. He entered Parliament, became solicitor-general in 1788, attorney-general in 1793, chief justice of the Court of Common Pleas (1799), and finally was lord chancellor for many years. His only politics were a lively hatred of the Rom. Catholics, and he was a poor speaker, a tedious but sound judge, and a victim to parsimony. But he was graced with a winning disposition, and he had a big share in estab. modern equity as a coherent

body of principles no longer measurable by 'the length of the Chancellor's foot.' See W. E. Surtees, *Sketch of the Lives of Lords Stowell and Eldon, 1846*; W. S. Holdsworth, *Some Makers of English Law, 1938*.

El Dorado: (1) means in Span. 'The Golden,' and was the name given to a fabulous city long believed to exist somewhere in the interior of S. America. The belief in the existence of the mythical city of gold was based on the tales of a Span. soldier, set adrift by his companions when exploring the Orinoco. Finding his way back some months later, he narrated how he had been taken by the Indians to a great inland lake with golden sands, on which was a vast city roofed with gold. Certainly as early as 1500 confused accounts were given to Span. sailors about a rich city abounding in gold and precious stones, situated on the borders of Lake Parima somewhere within Guiana or Guyana. Numerous Span. expeditions set out to find it and most of them came to grief on the Amazon. One of the seekers was Don Diego de Ordaz, governor of Quito, who was the first man to build a tn. (St. Thomas of Guiana at the confluence of the Caronian Orinoco in ter. now belonging to Venezuela). Among other futile expeditions, of which E. D. was the imaginary goal, were those of Orellana (1540), Philip von Hutten (1511-45), who told how once he had caught a glimpse of the gleaming city, and Ximenez de Quesada (1569). Also in quest of E. D. was Sir Walter Raleigh, who set out in 1595 from gaol on parole, having sold his wife's and his own property in order to raise \$10,500 for the expedition. In this ill-fated expedition he lost his son, his health and his fortune and then chivalrously returned to England and to the scaffold. Undeterred by his chief's failure, Captain Keymis, at Raleigh's expense, undertook a second voyage and purported to identify E. D. with some spot on Lake Parima. The purely legendary Manoa, with roofs and walls of precious stones, to which Martinez said he had been taken, long occupied a conspicuous place on the map, till Humboldt proved it to be a fiction. But though E. D. was swept from the atlas, it has secured a high niche in literature as the goal of happiness after which humanity never wearies of striving. See D. G. Brinton, *The Myths of the New World, 1896*. (2) City of Saline co., Illinois, U.S.A., a trade centre with a pop. of 4482. (3) City in the oilfields of S. E. Kansas, U.S.A., co. seat of Butler co. Pop. 10,000. Centre of a farming and oil-producing region. (4) City of S. Arkansas, co. seat of Union co., chief tn. in the pioneer oilfield of the state. Pop. 15,800.

Elea, see ELIS.
Eleanor of Castile (1244-90), queen of Edward I. of England and half-sister of Alfonso X. of Castile, surnamed the Wise, accompanied her husband to the Crusade in 1270, and is said to have saved his life by sucking the poison from a wound inflicted by a poisoned arrow; was buried at Westminster.

Eleanor of Guienne (c. 1122-1204), queen of France and afterwards of England, daughter of William X., duke of Aquitaine, whom she succeeded, 1137; in the same year she married Louis VII. of France; accompanied him to Palestine, 1147. The marriage was annulled in 1151. In 1152 she proposed to and married Henry of Anjou, who became Henry II. of England, 1154; aided their son Richard's rebellion, 1173, and was imprisoned till Henry's death, 1189. She acted as regent during her son Richard I.'s absences.

Eleanor of Provence (c. 1221-1291), queen of Henry III. of England, daughter of Raymond Berenger IV., count of Provence. She married Henry in 1236, and was the cause of much of Henry's favouring of foreigners. Took the veil in 1276 and died at Amesbury, Wilts. Her eldest son was Edward I.

Eleatic School, The, school of Gk. philosophy which flourished from 570-450 B.C., so-called because its leaders were natives of the Gk. colony, Elea, in Lower Italy. Parmenides may not have been its founder, but he at least, with Zeno, became identified to a peculiar and especial degree with its salient principles. After the death of its great exponents, the Eleatics gave themselves over to futile verbal debates, whilst their serious contributions to mental science formed the basis of Plato's metaphysics. Parmenides and his adherents dilated on the unity of being and all phenomena, and on the paradoxical conception that 'the All is One,' and argued that this truth is hidden from the masses because their senses mislead and confuse them. Thought alone can attain to this conception by soaring high above the domain of the false and sensuous seemings.



ELECAMPANE

Elecampane, or *Inula helenium*, a composite plant with aromatic and bitter leaves and root. Formerly much used as an antiseptic aromatic herb, the root being candied and used for chest troubles. An ingredient of absinthe.

Election (in divinity), *see* PREDESTINATION.

Election, Equitable Doctrine of, in law, the act or right of choosing between two inconsistent alternate rights or benefits. It arises chiefly in cases of wills, but sometimes also in the case of a deed or other instrument. A person who accepts a benefit under a deed or will is obliged to conform with all its provisions. Thus, if A bequeaths B's property *x* to C, and A's property, *y* to B, B must 'make his election' between accepting his own *x* or A's *y*. See *Ency. of Laws of England* v.; Watson, *Practical Compendium of Equity*.

Elections in Great Britain: PARLIAMENTARY.—*The election writ—Polling districts.*—The authorisation for the issue of the election writs by the Clerk to the Crown is the royal proclamation after a dissolution of parliament; but where only a by-E. is to take place by reason of the death of a member, or the vacating of his seat in any other way, the writ is drawn up by the Clerk of the Crown in Chancery on the authority of the Speaker's warrant. The writs for a general election are always prepared in the Crown Office, and ready for issue in the event of a sudden dissolution before the normal term of five years. They are sent to the returning officers of the constituencies, who, in co. areas are the sheriffs, and in urban areas the mayor or chairman of the borough council. The postmaster-general, after giving his receipt, sends them at once, as registered letters, to local postmasters, who remit them to the returning officers. A book is kept by the postmaster-general for entering all particulars, and this book is open for inspection. Formerly notice had to be given within specified statutory periods of the day fixed for nominating candidates, but nomination day is now the same in all constituencies, the eighth day after the date of the Royal Proclamation. On that day the returning officer in each constituency attends at the municipal buildings or court house, within certain fixed hours, generally from 10 a. m. till noon, to receive nomination papers. Under the Ballot Act, 1872, each candidate must be nominated by a separate nomination paper, and the returning officer must supply a form of nomination paper to any registered elector requiring the same during the allotted two hours. The candidate must be sufficiently described in the paper and otherwise accord with the necessary formalities, its sufficiency being a matter for the decision of the returning officer who may reject it for non-compliance. His decision is final where he allows, but not where he disallows, an objection; an appeal being taken on a petition. The first schedule to the above Act requires that each nomination paper be signed by a proposer and seconder, both registered electors, and contain also the names and addresses of eight other electors in support of the nomination. Public notice must be given of withdrawals. If within one hour after the time appointed for the poll the number of nominated candidates does not

exceed the vacancies, they are to be elected. The polling dists. are fixed by the local authorities, but the returning officer fixes the polling stations. The Corrupt and Illegal Practices Act, 1883, provides that a polling station shall be assigned by the returning officer to each dist. in such manner that, so far as is reasonably practicable, every elector shall have his polling place within a distance not exceeding three miles from his residence. The returning officer must also select presiding officers for the different stations and a suitable staff of clerks. The returning officer's expenses are paid by the Treasury.

In the case of a by-election, proper notices must be given within the statutory periods of the day fixed for nomination, and also of the polling date. The actual dates within the statutory periods are determined on by the returning officer. In the case of a co. or dist. bor. election, the day of election is fixed by the returning officer not later than the ninth day after the date on which he receives the writ, with a clear three days' interval between the day on which he gives notice and the polling day; in the case of a bor., not later than the fourth day, with a clear two days' interval. In co. or dist. bors. polling must take place not less than two nor more than six days after nomination; in bors. not more than three days after nomination.

Qualifications and Disqualifications for Membership.—Membership of the House of Commons is remarkably free and unrestricted. The somewhat anomalous position is that a pauper, landless, homeless and without a vote, may be elected, while only a man of position and property, at least to the extent of being a householder of six months' standing and a ratepayer either directly or indirectly, may vote. The property qualification which formerly made candidature the privilege of the well-to-do was abolished in 1858, though the law had notoriously been evaded years before that date by fictitious transfers of land. With the removal of the necessity for any property qualification and the abolition of any incapacity by reason of religious creed, there are now no general grounds of ineligibility beyond the exclusion of aliens who have not been naturalised. The candidate must be either a natural born Brit. person or a naturalised foreigner. Colonists and native Indians are eligible. A candidate must be at least 21 years of age, though the production of a birth certificate is not required. Such disqualifications as exist are all put upon some special incapacity, either inherent, as in the case of infancy or lunacy, or acquired, whether by reason of some moral or social defect, *e.g.*, criminality, corruption, insolvency; or by reason of the holding of some office deemed incompatible with E. as a member for parliament. Those disqualified by reason of office include judges of the Supreme Court of Judicature, co. court judges, recorders as regards their own bors., London stipendiary magistrates, sheriffs as regards their cos., the commissioner of

metropolitan police, bankruptcy officials, barristers appointed to try municipal election petitions, and governors of colonies; those disqualified for other special grounds include infants, lunatics and idiots, felons who have neither served their term of imprisonment nor have been pardoned, and persons convicted of treason; pensioners at the pleasure of the crown, except civil service, army, or diplomatic pensioners; holders of any gov. contract other than company directors; clergymen of the Church of England, of the Church of Scotland, and Rom. Catholic priests (members of dissenting churches are, however, qualified); civil servants on the permanent staff of a gov. dept. are ineligible (commissioned officers of the Army, Navy, and Air Force are qualified, but Army officers become M.P. only at the sacrifice of half their pay. Returning officers may not stand for the places where they are commanded by writ to hold an election. Eng. peers and peers of Great Britain and the United Kingdom, being hereditary members of the House of Lords, are disqualified (it is the succession to a peerage and not the receipt of the writ of summons which is held to disqualify); Scottish peers are also precluded, including those outside the sixteen representative peers of Scotland; the Irish peerage is not disqualified, for by the Act of Union an Irish peer, providing he is not one of the 28 representative peers elected by the Irish peerage to sit in the House of Lords, may be returned for any constituency. An adjudicated bankrupt is disqualified until the adjudication is annulled or until he gets his discharge. A person once convicted of personally committing bribery or personation is for ever disqualified for the constituency in respect of which he was guilty of such corrupt conduct, and he is debarred from sitting for any other constituency for seven years. A candidate who has innocently, through his agents, committed the offences of personation, bribery, treating, or undue influence, is debarred for seven years, unless exonerated by the E. judges.

The Parliamentary Franchise.—The preparation of the register of voters, first provided for by the Reform Act of 1832, is the duty of the 'registration officers,' and is discharged under the Representation of the People Act, 1918, at the public expense, half being defrayed out of the local rates and half by the Treasury. The 'registration officers' are, in bor. divs., the tn. clerk, and in co. divs., the clerk of the co. council. The rate book is the basis upon which the registration officer draws up the list of voters. The franchise no longer rests on a property or occupation qualification so far as men are concerned, the Act of 1918 having substituted what is practically adult suffrage and mere residential qualification, though the minimum age for a female voter was thirty against twenty-one for a male. The Representation of the People Act (Equal Franchise), 1928, assimilated the franchise for men and women (both for the parl. and local gov. elections). The

qualifications for registration as a parl. elector are that the person is twenty-one years of age and not subject to any legal incapacity; and has the requisite residential qualification, or the requisite business premises qualification, or is the husband or wife of a person having a business premises qualification. 'Residence' is the actual inhabitation of premises, i.e. the place where he has his home and sleeps. The residence must have been during the whole of the qualifying period, i.e. three months in the constituency or in another constituency in the same parl. bor. or parl. co.; if not, it is essential that the residence should have been successive from a parl. bor. or parl. co. contiguous to that bor. or co. The Administrative Co. of London is treated as a parl. bor. 'Business premises' means land or other premises of at least £10 yearly value; the premises must be occupied for the purpose of the business, profession or trade of the person to be registered. By the Act of 1928 a person may not vote at a general election for more than one constituency for which he or she is registered by virtue of a residential qualification, or for more than one constituency for which he or she is registered by virtue of other qualifications of any kind. This means, in effect, that the person may, if qualified, lawfully vote twice at a general election, but one must be in respect of a residential qualification, and each vote must be recorded in a different constituency.

A person of full age, and not subject to any legal incapacity, who has received a degree is entitled to registration as an elector for a univ. constituency; a woman who has passed the final examination and fulfilled the conditions required of women by a univ. which did not at the time the examination was passed admit women to degrees is also qualified.

The voters' lists, as first compiled from the rate books, are supplemented by a house to house inquiry to ascertain the names of householders whose rates are paid through the landlord and the persons qualified as wives or lodgers. Under the Act of 1928, each parl. bor. and parl. co. is an 'electoral registration area.' It is the duty of the registration officer to compile a register for all persons entitled to vote whether as par. or as local gov. electors in his area, and he must comply with any directions by the secretary of state as to the arrangements for carrying out the registration. Separate lists are prepared for absent voters, the ballot papers being sent to the voters, who mark them and remit them with a declaration of identity. Voting by proxy is permitted in the case of naval and military voters in distant areas, and merchant seamen, pilots and fishermen at sea. A copy of the electoral lists can always be inspected at the office of the registration officer, and generally at the chief post office and other convenient places in the area. Claims and objections may be made by notice as directed. Appeals from a decision of a registration officer lie to the Co. Court; a further appeal on any point of law lies

to the Court of Appeal, whose decision is final. Persons disqualified from voting closely approximate to those who are ineligible as members of parliament. They include: aliens (unless naturalised); idiots, lunatics, felons (but not misdemeanants), peers in the House of Lords, persons employed for reward at elections, and persons convicted of corrupt and illegal practices.

The poll.—All polls at a General Election are held on one day. The presiding officer of each polling station must be at his station before 8 a.m. on polling day. He must then remove from the room all but authorised persons. It is advisable always to have adequate police support to hand. Voters may enter to record their votes at 8 a.m. Polling terminates at 8 p.m. A voter must present himself at his right station, and to ensure this the register is consulted. The actual recording of his vote takes place in a booth screened from observation. Voting is effected by marking a cross in the space opposite the chosen name. Where a voter gives as his name that of a person who has already voted he gets a special ballot paper which he does not place in the ballot box but hands to the presiding officer, who does not count it, but enters it on the 'tendered votes list.' Ballot papers may be marked for blind voters, voters physically incapable of recording a vote, or unable to read, or Jews who object to voting in the prescribed manner. At the close of the poll the presiding officer must deliver the ballot boxes and the various election documents, including unused or spoilt ballot papers, made up in separate packets, to the returning officer. The returning officer then opens the boxes and counts the papers in the presence of the candidates or their agents, afterwards mixing all the papers together. The actual counting of the votes must be in the presence of the agents, the returning officer rejecting papers invalid for want of an official, or any mark, for uncertainty, or by reason of the voter having voted for more candidates than he is entitled to vote for. The returning officer cannot vote at the election but should there be a tie between the candidates he may, if a registered elector, give a casting vote; but his casting vote is operative only if exercised on the declaration of the poll. Every candidate must deposit the sum of £150 with the returning officer, the sum being forfeited if the number of votes polled by him or her does not exceed one-eighth of the total number polled, and returned in any other case. The counted and rejected papers, after the ballot paper account of the returning officer has been verified in the presence of the candidates or their agents, are then sealed in separate packets and sent to the Clerk of the Crown, together with all the other election documents. It is in case there should be a demand for a scrutiny and recount of the voting papers in any constituency, or a petition presented to declare the elections null and void under the Corrupt Practices Act, that all the documents are stored in the Crown office cellars for a year and a

day before they are destroyed. The writs are kept by the Clerk of the Crown until the dissolution of Parliament, when they are sent to the Public Record Office, where they are preserved.

Corrupt and Illegal Practices at Elections.—The offences coming under the category of corrupt practices are personation, bribery, treating, and undue influence. Personation consists in applying for a ballot paper in the name of another, or after having once voted. The punishment is imprisonment with or without hard labour up to two years. Bribery (see at greater length under BRIBERY) as an election offence has a very comprehensive connotation. The element of corruptness is consistent with honesty of motive; the essential element is the intention to influence the mind of the person voting. By the Corrupt Practices Prevention Act, 1854, bribery consists in any gift or promise of a gift, directly or indirectly, to a voter, whether in the shape of money or any other valuable consideration, or of a promise of employment. It is bribery to pay money to another to be used in bribery, or to repay money known to have been so used. It is not bribery to pay money on account of legal expenses *bona fide* incurred at an election. By the Representation of the People Act, 1867, it is bribery corruptly to pay a person's rates to enable him to be registered as a voter and to influence his mind at any future election. It is sometimes difficult, by the light of the numerous decisions on the point, to say what is and what is not bribery, e.g. paying a voter's travelling expenses to the polling station after he has promised his vote is, but general payments to curry favour, without aiming at a particular vote or votes, are not bribery. Gifts after an election may be bribery if before the election something was said or done to raise the voter's hopes. Treating, which is really a specialised form of bribery, consists in providing or paying for meat, drink, or other entertainment so as to influence an elector, the latter being also guilty of treating if he corruptly accepts. The punishment for both bribery and treating is imprisonment up to twelve months with or without hard labour, or a fine not exceeding £200. Undue influence by the Corrupt and Illegal Practices Act, 1883, consists in the use of force, fraud, or threats to impede a person in the free exercise of his vote. To dismiss one's employees on the eve of an election may well amount to undue influence; so, too, giving a tenant notice to quit. But in every case a corrupt motive must be proved.

Illegal Practices comprise a great number of heterogeneous acts made illegal by the Corrupt and Illegal Practices Act, 1883; the element of corrupt intention is by no means essential. All such practices are misdemeanours, punishable summarily by a fine up to £100. Acts deemed to be illegal practices comprise the following: Expenditure by a candidate or his agent on his election beyond a certain amount, which varies according to the number of the electorate, the scale providing for a

maximum of 7d. for each elector in a co. constituency and 5d. in a bor.; paying or contracting to pay for the conveyance of electors to and from the poll; payments to electors for the use of any house, land, or premises for the exhibition of bills or notices; payments on account of any committee-room in excess of the statutory limit which is one for every 2000 electors with an additional room for an incomplete part of 2000 electors. It is not an illegal practice to make a fair business payment to an elector who is also an advertising agent. No person, unless authorised by the election agent of a candidate, may incur any expense by holding meetings or issuing advertisements or circulars to promote the election of any candidate. Other illegal practices are payments for bands or music, flags, and cockades; corruptly inducing a person to withdraw his candidature, or falsely publishing the withdrawal of a candidate; using as a committee-room any elementary school, or any club (other than a political club of a permanent character) where intoxicants or refreshments are sold; employing canvassers for hire; procuring a vote of a person not entitled to vote; voting with knowledge that one is not entitled to vote; employing at an election more than the statutory number of persons for remuneration; publishing false statements of fact in regard to the personal character or conduct of a candidate without belief in their truth; and, by the Public Meeting Act, 1908, creating a disturbance at a meeting held for the purpose of supporting the candidature of a particular person. Under the most recent Representation of the People Bill (1931), considerable importance is attached to the use of motor-cars at elections, the general view being that, if a fair vote is to be obtained, it is not desirable that one party should have more cars at its disposal than another. The method proposed is that only those cars should be used for taking voters to the poll which are registered with the returning officer, and these, in accordance with the directions of the secretary of state, will be allotted by the returning officer to work in various dists. and carry voters irrespective of their party allegiance.

Election Petitions.—These are only triable before two judges chosen, in England from the Divisional Court, and in Scotland from the Court of Session. Any rejected candidate, or nominee for candidature, or elector, may present a petition. A candidate declared elected by the returning officer, but whose return is questioned by petition, takes the oath and his seat in the House of Commons and serves in the usual course until the report of the judges is delivered to the Speaker and by him communicated to the House. It is in the discretion of the judges at the close of the trial to give or withhold a certificate of indemnity against further legal proceedings, civil or criminal, and all witnesses who speak the truth are entitled to such a certificate. The judges then certify to the Speaker of the House of Commons the result of their findings,

which may be either that the E. was void, or that someone was duly returned.

LOCAL GOVERNMENT.—The qualifications for the local gov. franchise as provided by the Representation of the People Act, 1928, are the same for men and women and the various stages of the election of a co. councillor or bor. councillor are regulated by Schedule II. of the Local Government Act, 1933. A person is entitled to be registered as an elector who is twenty-one years of age and not subject to any legal incapacity; and throughout the qualifying period occupied as owner or tenant any land or premises in that area; or is the husband or wife of a person who is entitled to be registered in respect of premises in which both the person entitled and the husband or wife reside. There is, in addition, a 'service' qualification for the local gov. franchise: a person who inhabits any dwelling-house by virtue of any office, service or employment is deemed to occupy the dwelling-house as a tenant and is thereby entitled to be registered provided the dwelling-house is not also inhabited by the employer. These qualifications apply to all local gov. E.s., whether bor., co. council, dist. council or par. council.

Borough Elections.—Where a bor. is not divided into wards, there is one election of councillors for the whole bor.; where a bor. is divided into wards, there is a separate election of councillors for each ward. The ordinary day of E. of bor. councillors is May 1.

Qualifications of Borough Councillors and Aldermen.—To be eligible as a councillor or alderman a person (1) must be entitled to be enrolled as a burgess, or (2) being so entitled in all respects save as to residence, must reside beyond seven but within fifteen m. of the bor. and in any case either (a) possessed of real or personal property to the value of £1000, or, in the case of a bor. having more than four wards, £500; or (b) in the case of a four-ward bor. rated on an annual value of £30, and in the case of a smaller bor. £15. But a person qualified as an elector and resident in the bor. requires no property qualification. Women may be elected councillors or aldermen.

City of London.—The lord mayor, sheriffs, chamberlains, and minor public officials of the city are elected in Common Hall by the freemen and liverymen of the city. Aldermen, common councilmen, and ward officers are elected at ward-motes by £10 freeman occupiers, ordinary £10 occupiers, and all other persons registered as parl. or local gov. voters for the city, and persons who but for the fact of non-residence would be entitled to be registered as parl. voters in respect of occupation.

COUNTY COUNCIL.—For the persons qualified as co. councillors or aldermen of counties, see under COUNTY COUNCIL. The Local Government Act, 1888, which created co. councils, regulates E. in connection therewith. The manner of conducting a co. council E. is as nearly as

possible assimilated to that of municipal elections.

DISTRICT COUNCILS.—The election of urb. dist. councillors is regulated by the urb. dist. councils election rules and of rural dist. councillors by the rural dist. councils election rules issued by the secretary of state in 1949 under the Local Gov. Act, 1933, and the Representation of the People Act, 1948. An urb. dist. need not be divided into wards but rural dists. are divided into electoral areas. Dist. councillors hold office for three years, one third of the council retiring each year, unless the co. council have made an order directing the whole of the councillors to retire together every third year. The returning officer is the clerk of the council or such person as might be appointed by the chairman of the council, and he must give Notice of an Election not later than the 20th day for urb. dists. and the 22nd day for rural dists., before the day of election. Sundays and public holidays and the Saturday before and the Tuesday after Easter and Whitsun are excluded in the computation of time. The returning officer must provide nomination papers free of charge to any local gov. elector of the area applying for them. The nomination papers must be signed by two local gov. electors for the electoral area, as proposer and seconder, and by eight other electors. The candidate must assent in writing to his nomination and must appoint an election agent. Nomination papers must be received by the returning officer not later than noon on the 14th day for urb. dists. and the 16th day for rural dists. before the day of election. The day of election is such day during the week commencing with the Sunday before the 9th May or if Sunday is the 9th May then with that day (provided that if that week is the week before Whit Sunday the election shall be held in the week ending with the Thursday before Whit Sunday) as the co. council may not later than the preceding Feb. fix with the dist. council. Public notice of the poll must be given by the returning officer five clear days at least before the election. If there are no valid nominations or the valid nominations are less in number than the vacancies, those retiring councillors who were highest at the poll at the last ordinary election will be deemed elected in order to fill up the vacancies. Within thirty-five days after the end of the poll a Declaration of Expenses must be sent to the clerk of the council. When a casual vacancy arises a person is elected to hold office until the time when the councillor whose place he takes would ordinarily have gone out of office. Subject to certain modifications made by the Representation of the People Act, 1948, the statutes which deal with corrupt and illegal practices and election offences are applied to the elections of dist. and par. councillors. In Scotland elections are regulated by the Local Gov. (Scotland) Act, 1947, and the Representation of the People Act, 1948. The manner of conducting these elections, which are held in the burghal and landward areas, is closely assimilated with

that of the municipal and co. councils respectively. The election of par. councils is regulated by the Par. Councils Election Rules, 1949, and par. councillors are nominated and elected in the same way as dist. councillors; any person qualified as a local gov. elector in the area is qualified to vote at a par. council election. Par. councillors retire together every third year.

Elections, Presidential (U.S.A.). By the Federal Constitution each state is to appoint, in such manner as its legislature may direct, a number of electors equal to the whole number of senators and representatives to which the state is entitled in Congress. These electors then vote for the president and vice-president. Theoretically, the people at large have no direct voice in the election, and the electors, or electoral college, have an unfettered freedom of choice, which freedom was formerly in fact exercised. As a fact the party system has long ago ensured that the persons nominated at the great National Party Conventions for the offices of president and vice-president shall ultimately be voted for by the members of the electoral college. The electors themselves are polled for, by a direct vote of the citizens on a 'general ticket,' like the *Fr. scrutin de liste*, but the candidates for the office of elector are all nominated beforehand by Party Associations, with the result that as soon as the polling for electors is over, the choice of the new president and vice-president follows as a matter of course. By the Constitution Congress may determine the time of choosing the electors and the polling day, which must be the same throughout the states. The election is held every fourth year, and at the present day electors are chosen in the different states on the Tuesday following the first Monday in Nov. The electors thereafter meet in their state capitals to record their votes on the second Monday in Jan. next following their appointment. Their certificates of choice are sent to Washington and opened and counted in the presence of both Houses of Congress on the second Wednesday in Feb. (For qualifications of the President, see under CONSTITUTION.) No senator or representative or person holding an office of trust or profit under the U.S.A. is eligible as an elector. If there be no majority of votes for President, the House of Representatives chooses one from the three names highest on the list, each state having one vote; if no majority for vice-president, the Senate chooses one from the two names highest on the list. **Election of Senators.**—The Senate consists of two members from each state elected by popular vote for a term of six years. Candidates for the office of senator must be over thirty years of age, have been citizens of the U.S.A. for nine years, and be residents of the state for which they are elected. **Election of Representatives.**—The 435 members of the House of Representatives are elected every second year according to the electoral laws of the several states. They must be citizens over twenty-one years of age and have lived in the country

at least seven years. The forty-eight individual states, through their legislatures, have the power to prescribe the qualifications that entitle a citizen to vote. Thus the time of residence required in a state before being allowed to vote in that commonwealth varies from two years to three months. There are further qualifications as to length of residence in the co., the city and the ward. Before any citizen votes, he must register for this purpose on a day set aside for the business, and is subject to challenge by representatives of the various political parties if they do not think he is eligible.

Electorate, in a political community, denotes the whole body of persons entitled to the right of electing the chief magistrate or other representatives to the communal assembly. The idea of election in one form or another is as old as the institution of the earliest units of the state. In England and other Teutonic lands the families enlarged into clans, occupying each its original common ter., early developed into the territorial unit of the *mark* or *township*. The township, then, was the lowest territorial div. and political unit of a tribe, and possessed its own assembly and peculiar political organisation. This unit, which in other countries is the commune, in England becomes either the *municipal corporation* or *par.* It is doubtless true that the feudal system and the manorial system changed the primitive community of the mark or township, holding its common land by its own right, into a body of tenants, holding their land of a feudal baron; but their essential character as political units was never really lost, and it may be said that the whole electoral system of England (apart from the representation of the classes in the cos.), modified admittedly in the course of time, grew out of the principle of representation as evolved in the tns. of the Middle Ages. Their adaptability to this end was due partly to the fact that even before the Conquest they possessed a complete political organisation, partly to the wealth that accrued to them from the grant of the charters of incorporation. Before the Conquest and immediately after many of them passed into the absolute ownership of the overlord; but the necessities of the latter soon led to the corporators gaining a measure of independence through the commutation of the feudal exactions for a fixed rent (*firma burgi*). Other territorial divs. such as the shire and the hundred co-existed with the tn. or bor., but in most cases the latter, especially after acquiring charters, were for all judicial and administrative purposes independent of those divs. The folk-moot of the shire and the moot of the hundred were no doubt assemblies consisting of local representatives, but they met almost exclusively for the purposes of bringing criminals to justice or assessing the freeholders to the royal revenue, and from compulsion of natural circumstances could never have acquired the integral civic existence of the tns. These, on the other hand, soon developed a strong

organisation for administrative as well as merely judicial purposes, and, through the institution of merchant and craft guilds fostered by the crown, rapidly acquired considerable accession of wealth both from their exclusive privileges of buying and selling free from exorbitant tolls and from the revenue accruing from corporate property. The guilds all tended to become the governing body of the tn. and still further developed their privileges of self-gov. and self-assessment. The result was that they became close corporations, election to which was a thing to be coveted, and the representation of which in parliament an object no less desirable. Parallel with the development of the bor. franchise, the co. representation was evolved through the elective principle of the old co. court (q.v.). In pre-Norman times the freeholders assembled in the co. court or shire-moot for fiscal and judicial purposes, and to the moot also came burgesses, and the reeves from the tns. Later the tn. representatives seceded, having through the grant of charters gained a right to send out their own representatives to bargain with the exchequer officials. The co. freeholders continued to elect knights, who either assembled in the co. court or were summoned by the sheriff to some central point for the same purposes, or to be consulted about a grant. When this representation for purposes of assessment became a representation for deliberative purposes too, election to parliament in the modern sense was begun. At first it seems that tns. did not appreciate the honour of sending members to parliament, and the representation, such as it was, was chiefly the co. representation of the classes. Many Acts were passed in the beginning of the fifteenth century to regulate the franchise in the cos., and in 1430 an Act was passed to restrict the right of voting for knights to persons possessing freeholds in the shire to the value of forty shillings a year, and all copyholders and villeins were disfranchised. The forty-shilling freeholders remained the only co. voters till the Reform Bill of 1832. In the intervening centuries, however, the bors., grown wealthy, began to realise the value of the right of election. Control over the royal expenditure meant the power to secure the redress of grievances. There was, however, always this difference between the co. representatives and those of the bors.: the crown could increase or diminish the number of bors. represented—a power based on the doctrine that bor. privileges were gifts of the crown, and that their status was historically that of the royal demesne; the number of shire knights, on the other hand, could not be altered. From this fact and the subsequent association of the knights with the burgesses as representatives of the people instead of the classes, the representation of the third estate of the realm was saved from the extinction that the corresponding bodies encountered abroad. But the institution of the representation of the third estate of the realm was as yet a far cry from even the most modified

democratic ideal. The bors. rapidly became corrupt, the franchise passing into the hands of a close body of corporators who frequently sold the bor. seats to the king's ministers. By the beginning of the nineteenth century the bor. had practically ceased to represent public opinion at all. From the time of the Reform Bill in 1832, which abolished the 'rotten' boroughs, there has been a series of Acts extending or limiting the franchise in one direction or another, and, until recently, leaving the general system of the Eng. E. in a somewhat bewildering condition. In 1884 the franchise conferred in 1867 on householders and lodgers in bors. was extended to similar persons in the cos. A year later the E. in England underwent a fundamental alteration, the whole country being divided into numerous co. and bor. constituencies, each co. being subdivided into two or more constituencies, and each constituency returning one member, the idea being to create equal electoral dists. The principle of div. adopted by the Redistribution of Seats Act, 1885, was eminently in accordance with the democratic feeling that had grown in intensity from the time Rousseau first preached the doctrine of equality. All the bors. with a population of less than 15,000 were disfranchised or merged in their cos., with the result that the inhabitants of the disfranchised bors. became voters for some single member co. constituency; bors. with more than 15,000 but less than 50,000 inhabs. were to return one member each, while those of over 100,000 inhabs. were divided into separate constituencies, with additional seats in proportion to their pop. At present England and Wales (including Monmouth), with a pop. of 39,952,000 (census of 1931) (41,460,000 in 1941) and an E. of 28,348,555 (1939) or 28,956,996 (1945) returned (in 1945) 553 members (Wales and Monmouth returning 36 of these); Scotland, with a pop. of 4,842,980 (census of 1931), (5,007,000 in 1941), and an E. of 3,396,323 (1945), returns 74 members; and N. Ireland, with a pop. of 1,279,745 (census of 1937) or 1,288,000 (1941), and an E. of nearly 800,000 returns 13 members. It is noteworthy that in the days of rotten bors., when the total pop. was only 7,000,000—of which 5,000,000 could not read or write—there were 558 members of the House of Commons, which means that each member represented on the average no more than 500 voters as against about 74,000 to-day. The net result of the reforms of the nineteenth century was an accession of power to the executive and the E. at the expense of the House of Commons. Prior to the Reform Act of 1832 a defeat of the ministry did not necessarily involve its resignation. Both the ministry and the majority in the House were for the most part in the confidence of the king. But after 1832 a general election became for the first time nothing more nor less than a vote to return a House pledged to support some particular politician with the result that a change of ministry necessarily followed.

The distribution, prior to 1918, was far from perfect. The progressive shifting of the pop. and the huge absolute increase in the whole pop. since 1885 rendered the old distribution in numerous instances peculiarly inequitable and as far removed from the spirit underlying the idea of equal electoral areas as the principle of plural voting from the doctrine of equality of all men. The result of this general inequality of areas and voting power was an agitation of intermittent activity for various reforms, some having for their object the substitution of a purely personal for a proprietary qualification, others the representation of the political opinions of the minority. The various aspects of the question of representation of minorities, the case for which was first thoroughly advocated by John Stuart Mill, included (1) an attempt to secure additional power in the representation for the educated, thrifty, and well-to-do (fancy franchise); (2) an attempt to secure representation for every opinion which can find supporters equalling in numbers the result of the division of voters by seats; (3) an attempt to break the power of the majority through the instrumentality of such a machine as the so-called three-cornered constituency of the Act of 1867; and (4) an attempt of the advocates of proportional representation to offer a wider choice to the voter and to secure the return of independent members. (See also PROPORTIONAL REPRESENTATION.) On the introduction of adult suffrage by the Representation of the People Act, 1918, the E. increased from 8,357,000 to sixteen million, including six million women. The Representation of the People (Equal Franchise) Act increased it considerably (see ELECTIONS), the large increase over 1918 being accounted for by reducing the age limit for women from thirty to twenty-one years of age and by giving all women the vote on equal terms with men. Proportional representation is applied only to Univ. constituencies returning two or more members: eleven seats were thereby affected.

Redistribution of seats.—In 1945 four boundary commissions, with the Speaker of the House as chairman, were set up under the House of Commons (Redistribution of Seats) Act, 1941, to make proposals for a redistribution of seats so as to remove inequalities of representation caused by movements of the pop. since constituency boundaries were last redrawn in 1918. This complete redistribution was to take effect at the next general election (1950). In the preceding thirty years social and industrial changes had led to an immense shifting of pop. and even before the beginning of the 1939-45 war, when evacuation brought a further temporary distortion, the inequalities of representation had become most marked. The Ee. of constituencies represented by one member varied from under 20,000 to more than 200,000. The worst inequalities were removed by an interim redistribution in twenty abnormally large constituencies in England which preceded the election of 1945. These

constituencies, headed by Hendon with 208,000 electors, were split into forty-five, and, with twenty-five new members, the membership of the House was increased from 615 to 640. But pronounced inequalities remained, for, at the 1945 election, there were 115 constituencies with Es. of under 40,000 including eleven with fewer than 20,000. The Eng. boundary commissioners were at first handicapped by the rule in the Act of 1944 which limited the E. of a constituency to a figure which was to be not more than about a quarter above or below the electoral quota for the whole of Great Britain. It was found impossible to comply with this rule without cutting across local gov. boundaries and severing communities long closely united. The first recommendations for redistribution, made in 1947, raised a storm of protest. The scheme was seen to be impracticable, and an amending Act of 1948 relaxed the rule above noted that had caused the difficulties. While aiming at approximate equality in Es. the commissioners were now instructed to preserve the integrity of local gov. wherever they reasonably could. They were also instructed to relate redistribution to the E. as registered in Oct. 1946. With greater latitude they began a fresh review and their new provisional recommendations in all four countries, England, Wales, Scotland, and N. Ireland, were then pub. The commissioners also had regard to the statutory rule that, while the number of constituencies for Great Britain should be 'not substantially greater or less than 591,' there should be no reduction in the number of constituencies in Scotland or Wales and that the number in N. Ireland shall remain as at present. This means that Scotland must still have not fewer than 71, Wales not fewer than 35, while N. Ireland is to retain precisely 12 (this leaves out of account the 12 members of university constituencies). On the basis of the provisional recommendations the total strength of the next House of Commons will be reduced from 640 to 621. It is proposed to reduce the number of Eng. constituencies from 510 to 488 (excluding the city of London) and to increase Welsh constituencies to thirty-six. All these will return one member. Thus the numbers will be: England 489, Scotland, 71, Wales 36, N. Ireland 12, city of London 1, univs. 12: total, 621. The final recommendations which may be further modified by the home secretary, will be submitted to Parliament in a Bill, which will also contain a provision concerning the representation of the city of London. The City is a two-member constituency whose 1939 E. of 38,022 had fallen in 1948 to 12,503, of which 7,918 were business premises votes and it seemed improbable that the City's privilege of returning two members for so reduced an E. could be longer justified. There are at present (1948) ninety-two constituencies with Es. of less than 40,000 and 131 of more than 70,000, including many of more than 100,000. The proposed redistribution will abolish all those

of less than 40,000, while the bigger constituencies have been heavily pruned.

A feature of the proposed redistribution is the introduction of new constituency names. Brighton, one of the two member bors. to be severed into two constituencies, will now have a Pavilion div. Lambeth is to have a new Vauxhall div. Stratford on Avon is carved out of Warwick and Leamington as a new co. div. In some of the new constituencies the names of anc. bors. are revived, e.g. Arundel and Shoreham, W. Sussex; Beverley in E. Yorks; Poole in Dorset; and Beaconsfield in Bucks. The present two-member bor. of Southampton will become two new divs. of Itchen and Test. Rowley Regis is a new parl. bor. of Staffordshire. Yet other new constituency names are Blyth, Goole, Harrogate, and Newton Abbot. Some notable constituency names will disappear. Thus Lincolshire (20,013) will go. Westminster, despite its record of four centuries of parl. history, will be merged with Chelsea in the new parl. bor. of Chelsea and Westminster. Of the two divs. into which this new bor. will be divided the present Abbey div. (of Westminster) is to remain, but not St. George's. Other losses are the Drake div. of Plymouth, Bewdley (Worc.), Balham and Tooting, Spen Valley, the Ladywood and King's Norton divs. of Birmingham, Sudbury (with Dickensian memories of Eatanswill, Frome, Rye, and the Wrekin div. of Shropshire).

With all the readjustments proposed, England is to be divided into 266 bor. and 222 co. constituencies. This will give England 488 members for 28,700,000 electors. The 2,380,000 electors of the twenty-eight metropolitan bors. of London are at present represented by 60 members. These 60 seats will be reduced to 40. Improved social conditions and transport have enabled masses of people to reside in suburban areas. Poplar, Southwark, Stepney, Battersea, Bermondsey, Bethnal Green and Paddington, which now return 16 members, have all been reduced to single-member constituencies. Hackney and Stoke Newington have been amalgamated into a new parl. bor. of two divs.; similarly Holborn and St. Pancras, and Finsbury and Shoreditch will together return one member. Lewisham's two divs. are increased to three and Paddington, reduced from two to one div., is left with an E. of nearly 87,032, which will be the biggest in England. Other large single-member constituencies in London are Hammersmith (81,887), and Battersea (82,679), which have been similarly reduced from two to one div. Some big provincial cities, such as Leeds, Bristol, Hull, Leicester and Portsmouth will suffer no loss of representation. Birmingham's thirteen divs. will be reduced by one. Manchester (ten) and Liverpool (eleven) will be reduced to eight divs. each. Sheffield (seven) will be reduced to six, Nottingham (four) and Bradford (four), to three. Salford (three) and Wolverhampton (three), will each lose one seat. Newcastle (four) will retain

four seats, though at first it was proposed to take one away; but it will have its E. increased to over 76,000. Norwich (two) will have only one member to represent an E. of 86,406. Huddersfield is to have its E. increased to 97,242, with two members instead of one. With an expanded electorate of 213,399 Bradford's representation is to be reduced from four members to three. Lancashire, with 3,609,000 electors, at present returns sixty-seven members; this number will be reduced to sixty-one. The four two-member hors. of Blackburn, Bolton, Preston, and Oldham, have each been divided into two constituencies returning a single member, in common with all other two-member hors. Liverpool and Manchester both have many very small Es. at present, and a loss of five seats between them seems probable. The three Ridings of Yorks., which together return fifty-seven members, will have that number reduced to fifty-five, representing thirty-four hors. and twenty-one co. constituencies. With the loss of one of its seven seats Sheffield will have the same representation as Leeds. Doncaster, Pontefract, and Keighley, all at present co. divs., will become parl. hors. Except for the reduction of Plymouth's representation from three to two and the substitution of Newton Abbot for the S. Molton div. of Devon, there will be few changes in the W. Country. In the Home Cos., however, there will be a considerable rearrangement of cos.: thus Surrey's fourteen seats will be increased to nineteen; and Middlesex's twenty-four seats will be increased to twenty-eight, with the creation of a number of new parl. hors., e.g. Enfield, Uxbridge, Hayes and Harrington, and Ruislip and Northwood. In Wales, the famous constituency of Caernarvon Bors., represented for fifty-four years by David Lloyd George, will disappear, but to offset the loss a second co. div. bearing the historic name of Conway is allotted to Caernarvonshire. In Scotland, a rearrangement of the eight constituencies in Midlothian and Peebles will increase Edinburgh's five divs. to seven. The Montrose District of Burghs and the Dumbarton Dist. of Burghs will each disappear and there will be a new Ayrshire div. of Cunningham and Irvine. N. Ireland, with 864,700 electors, is to have twelve single-member constituencies. This involves the div. into two constituencies each of the present two-member parl. cos. of Antrim, Down and Fermanagh, and Tyrone. Belfast will continue to return four members and the cos. of Armagh and Londonderry one each.

The principle of equal electoral areas obtains in the United States, Canada, and S. Africa; other countries, like Switzerland, still adhere to the system of representation of com., or ter. divs. for administrative purposes, like the old Eng. shires, hundreds, and chartered tns. A system of double election prevails in the U.S.A. and in France. In the U.S.A. the E. elect the members of the Electoral College on the Tuesday after the first Monday in Nov. of every fourth year, when the presidential election takes place.

The Electoral College is thus composed of states' representatives, who, on the second Monday of the succeeding Jan., elect the president. There are 531 votes in the Electoral College, and therefore 266 secure a majority. As in U.S.A. so in England, an election really means that the E. chooses some one particular politician, for the Electoral College is no more than a species of conduit pipe, and in practice exercises no independent choice. *See also CABINET.*

Electors, The German Imperial (*Kurfürsten*), the great princes in whom was vested the right of choosing the emperor or king of the Romans. Under the Carolingians the crown was hereditary, then Germany became an elective monarchy, and finally by 1257 the number of electors was fixed at seven—three lay princes, the Count Palatine of the Rhine (imperial steward), the Duke of Saxony (marshal), the Margrave of Brandenburg (chamberlain), and three spiritual electors, the Archbishops of Mainz, Trèves, and Cologne (chancellors). As to the seventh elector there remained considerable doubt. Bavaria claimed the place, but in 1289–90 the King of Bohemia was chosen. During the Thirty Years' war, Bavaria was added to the electors (1623), the Peace of Westphalia (1648) finally establishing the electorate. In 1692 the ninth electorate of Brunswick-Lüneburg (recognised in 1710 as Hanover) was added. Changes took place during the Fr. ascendancy, and the electors' powers really came to an end (1806) on the dissolution of the Holy Rom. empire, though as late as 1866 the title 'elector of Hesse-Cassel' was used. *See O. Harnack, Das Kurfürstenkollegium, 1883; H. Fisher, The Medieval Empire, 1898; E. Henderson's trans. of the 'Golden Bull' issued by Charles IV., 1356, in Select Historical Documents of the Middle Ages, 1896; A. Meister, Deutsche Verfassungsgeschichte, 1922.*

Electra (Gk. Ἠλέκτρα, the bright or brilliant one) was the daughter of Agamemnon and Clytemnestra, and sister of Iphigenia and Orestes. She saved her brother from Egisthus and Clytemnestra, who after the murder of Agamemnon intended to kill him, and later assisted him in avenging Agamemnon's death. She married her brother's friend, Pylades, and became by him the mother of Medon and Strophius. Her tomb was shown in later times at Mycenae.

Electrical and Mechanical Engineers, Royal. *See under ROYAL.*

Electrical Fume Precipitation, *see FUME PRECIPITATION.*

Electric Batteries, *see ACCUMULATOR; CELL, VOLTAIC.*

Electric Accounting Machines. Machines for book-keeping, calculations, statistics, and inventories. The punched card system of the Hollerith method permits business transactions of all kinds to be recorded, not in written books, but on specially designed manilla cards by means of perforations. The numerical significance of the holes is determined by their position in the cards. Cards can be designed for any purpose and information

is recorded by a hand-operated key punch capable of very high speeds. Accuracy of punching is checked by a second operator in a verifying key punch. The punched cards—which form, as it were, mobile figures—can be classified, sorted or selected in an electrical sorting machine. After sorting, the cards are passed through a tabulating machine which will either list each individual card or, alternatively, accumulate totals of the sorted groups of cards and print these totals in appropriate forms. Invoices, statements, ledgers and any kind of statistical return or inventory can be rapidly compiled by the Hollerith method which eliminates subsidiary book-entries and produces results direct from the original record, the punched card. In addition to the advantage inherent in high speed the greatest flexibility in operation is provided by an easily manipulated control panel.

Electric Bells and Alarms. Chief parts of an ordinary E. B. are the electromagnets A, and the armature C to which the knocker of the bell is attached. C is

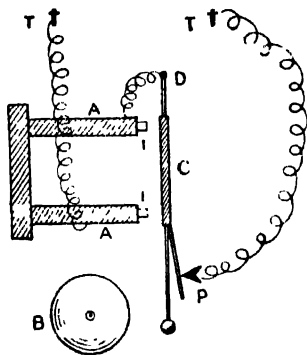


FIG. 1

connected by a thin spring to the point D. At P there is a platinum-pointed screw which makes contact with a spring attached to C. B represents the bell itself. The electro-magnet A is made in the shape of a U, and the wire is wound around the arms so that when the current passes the coils, which are connected in series, the magnet becomes one of the horseshoe variety. The two coils are joined together, the other end of the wire being connected to T and to D. The armature is fastened to D by means of the spring. The terminals T are connected to the external circuit. Now consider the action of the mechanism: initially the screw P is in contact with the spring attached to C; a complete circuit is thus formed and immediately the magnet becomes excited and attracts to it the armature C; this effects a break in the circuit at P, the current stops and the magnets

then cease to attract C, which flies back under the action of the spring attaching it to D and again making contact at P. In this way the circuit is alternately made and broken at P, thus giving to the armature C an oscillating motion which causes the striker to strike the bell B continuously. The above type is called an *electric trembling bell*. For signalling purposes the *single stroke bell* is more useful. This bell is very similar in construction to the trembling bell; but the screw P is omitted, the terminal T being connected directly to D. Thus when the current passes, the magnets are excited and the armature is attracted to them, thus causing the striker to strike the bell. So long as the current flows, the magnet continues to be excited, and thus C will not fly back until the current is broken in the outside circuit. It should be noted that the circuit is not broken inside the bell as in the trembler, but by means of a push button (say), which can be manipulated at the will of the operator, the bell being struck once for each contact made at the push. A simple circuit for ordinary household use is shown in Fig. 2. The

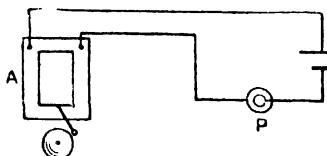


FIG. 2

terminals of the bell A are connected to the poles of the battery, the push P being inserted at any convenient point in the circuit from which the circuit can be completed, thus bringing the battery B into action and causing the current to flow through the bell. Various types of bells are now used, and one further type may be noted. This is the *continuous ringing bell*, which is used mainly in connection with fire or burglar alarms. This bell continues to ring when once started until it is checked by means of a small cord which hangs down the side. In construction it is similar to the trembling bell, but it has in addition a third terminal, a trigger, and another contact pillar. The trigger rests upon the armature, and when this armature is attracted by the magnets, the trigger is released and makes contact with the second pillar, thus completing the circuit and causing the bell to continue ringing. By means of the cord attached to the trigger it can be drawn back to its normal position and the ringing checked.

Indicators.—When a number of push-buttons are installed in the same house, it is necessary to know at which push contact was made in order to ring the bell. The indicator is a simple device suited for this purpose. It consists essentially of an electro-magnet M and an armature A pivoted at P, with a flag attached at its

lower end. When the current passes the magnet is excited and attracts the armature, causing the armature to rotate about P. When the current stops the armature falls back under the action of gravity and continues to swing like the pendulum of a clock for some time after the current has ceased to flow. One of these is put 'in series' with the bell for each position of a push button, and thus acts as a signal. These indicators are all

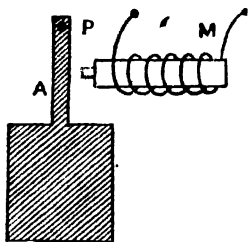


FIG. 3

collected together on one board called the 'Indicator Board.'

Burglar alarms.—These generally consist of devices attached to windows, doors, etc. They consist generally of a brass plate attached to the movable part, and a spring to the fixed part of the window. They are so placed that any movement of the window will bring these into contact one with the other, thus completing a circuit and setting the bell ringing.

Fire Alarms. See under FIRE BRIGADES AND FIRE-FIGHTING. For minor faults in household systems, see under HOUSEWIFERY.

Electric Cables. These are conductors through which electric currents are carried from place to place.

Manufacture of cables.—The interior of the cable consists of a bundle of copper wires. These are treated with tin to protect them from the action of sulphur. In the smaller cables these wires are then covered by a layer of tape, but in the larger cables this is generally omitted. The wires are then coated with vulcanised bitumen, and the whole is pressed into one solid mass of uniform thickness by the application of very high pressure. A covering of tape which has been treated with bitumen is then added over the vulcanised bitumen. The number of coatings of this tape varies in different cables. Underground cables are treated further by the addition of a coating of jute yarn, and then one of hemp braid. It may be pointed out that after the addition of each of the above coverings, the cable is pulled through a vessel containing hot compound. The insulation is made more perfect by increasing the thickness of the layer of vulcanised bitumen. When cables are employed for conducting alternating currents, both the return and outgoing conductors are placed concentrically

in the same cable and insulated from each other by a thick coating of vulcanised bitumen. By this method inductive effects of any apparatus, e.g. a telephone in the vicinity of the cable, are eliminated, and there is also a diminution in the power lost due to induced currents in the coatings of the cable.

Laying of cables.—When put inside a building, they must be protected and well insulated. Generally, perhaps the most efficient method is to enclose the wire in iron tubing. There are three important ways of laying underground cables. In the first system the cables are placed in rectangular iron troughs, the dimensions of which depend on the number of cables which they have to contain. The cables are kept as far away as possible from the iron, and are supported inside by wooden bridges, in which slots are cut to fix the cables a sufficient distance apart. The bridges are treated with bitumen before being placed in position. When the cables are laid, the whole trough is filled with bitumen and then covered with a layer of concrete. This is the solid system, but it has the disadvantage that only with difficulty can a cable be withdrawn in the event of a fault occurring. However, because of the good insulation, the occurrence of a fault is very rare in this system. Another system which overcomes this difficulty is by using blocks of bituminous concrete containing circular holes bored longitudinally. Only one cable is placed in each hole. Manholes or draw-boxes are provided at convenient places, and when the concrete blocks are being fitted along in a trench, the cables may be drawn through the hole. If a fault occurs the offending cable can easily be removed without digging up the trench. In a third system, a fibrous material is used as the insulator. This generally consists of layers of tape and fine yarn in the order named, and these are saturated with hot bitumen. Immediately, before the bitumen has had time to cool, a coating of lead is put on by the aid of hydraulic pressure. This has the great advantage of being practically impervious to either air or moisture. For submarine E. C., see under CABLE. See P. Dunsheath, *High Voltage Cables*, 1930; 'Proton,' *Cables and Wires*, 1945.

Electric Circuit. A circuit consists of any closed network of wiring along which a current will flow. The most important law applied to such a network is that due

to Ohm, which states that $C = \frac{E}{R}$ (where

C represents the current, E the electromotive force, and R the resistance, all these quantities being measured in practical units). The resistance of the wires is the question to consider under this heading. The resistance of a wire depends on the material of which it is made, upon its length and area of cross section, and upon the temperature. Expressed mathe-

matically $R = \rho \frac{l}{s}$, l = length, s = cross section, and ρ is a constant at any particular temp. its value depending on the

material. ρ is called the specific resistance of the material, and is measured by the resistance of a piece of the wire 1 cm. long and of 1 sq. cm. cross section. The specific resistance varies with the material of the conductor, the specific resistance of a good conductor being low, whereas that of a bad conducting material is very high. The effect of temp. is generally to increase the resistance with a rise of temp. The resistance of many materials decreases with rise of temp. Two important laws, due to Kirchhoff, are often applied to a network. The first states that no electricity can disappear in any part of the circuit. Thus, if a number of wires branch out from a main, the sum of the currents in the branches is equal to the current in the main wire. The second law states that in any network the fall of potential is always equal to the product of the current and the resistance of the wire between the two points considered.

Resistances in series and in parallel.—Resistances joined in series are shown in Fig. 1, where the two resistances are joined

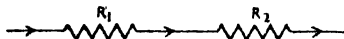


FIG. 1

in the circuit, forming a continuous path. The symbols used having the same meaning as before, the effective resistance will be the sum of the two resistances, $R = R_1 + R_2$. Fig. 2 shows four resistances

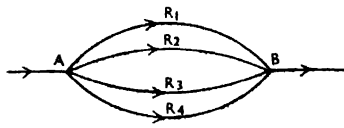


FIG. 2

joined in parallel. If E = fall of pressure between A and B, and C_1, C_2, C_3, C_4 be the currents in the wires R_1, R_2, R_3, R_4 , respectively, also if C be the total current, and R the effective resistance of the four wires, then $C = C_1 + C_2 + C_3 + C_4$. But $C = \frac{E}{R}$, also $C_1 = \frac{E}{R_1}$, $C_2 = \frac{E}{R_2}$, and so on.

Thus $R = \frac{E}{C} = \frac{E}{C_1 + C_2 + \dots}$, and hence $\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \frac{1}{R_4}$.

Battery resistance.—The battery forming part of the circuit offers a resistance to the production of the current. This is termed the internal resistance of the battery in contradistinction to the external resistance. The internal resistance is generally represented by r , and the external resistance by R , thus the total resistance is $r + R$. Hence $C = \frac{E}{r + R}$, and for large currents a battery of low resistance should be used in order to minimise the resistance.

Grouping of cells.—Cells may be grouped in series or in parallel as illustrated in Figs. 3 and 4. In the series grouping the

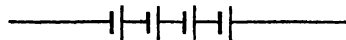


FIG. 3

opposite poles are joined together, whereas in the parallel grouping poles of the same sign are grouped together. Suppose the number of cells grouped together in

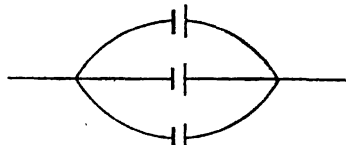


FIG. 4

either system be n . The total E.M.F. in the series grouping will be nE , the total battery resistance nr , and thus $C = \frac{nE}{nr + R}$.

$$C = \frac{nE}{nr + R} = \frac{E}{r + \frac{R}{n}}$$

In the parallel grouping the total battery resistance will be $\frac{r}{n}$, and the E.M.F. will be equivalent to that of only one cell. Thus $C = \frac{E}{\frac{r}{n} + R}$. Clearly

then, for maximum current, when the external resistance is high compared with the battery resistance, the series grouping is the more efficient, whereas when the external resistance is low in comparison, the parallel grouping is more suitable.

Counter E.M.F.—When a current is passed through an electrolyte (a liquid conductor), an E.M.F. is set up in the opposite direction and thus decreases the current flowing. The effective E.M.F. is the difference between the driving E.M.F. and this opposing E.M.F. Thus if e represents this opposing E.M.F., then $C = \frac{E - e}{R}$.

Alternating current circuit.—It has been noted under dynamos that in an alternating current, the current moves backwards and forwards, thus showing that the E.M.F. must be a varying quantity; this variation may be shown graphically as it approximates to a sine curve. This curve may easily be drawn as follows: Take the circle of Fig. 5 and divide its circumference into a number of equal parts, and then divide the line AA in Fig. 6 into the same number of equal parts. Let the radius OB of the circle rotate, and when it comes to a marked point, such as B', measure off the vertical height B'b, above the line AA and draw this line from the corresponding point B' in Fig. 6. When a complete revolution has been

made, we have all the points between the points AA; and by joining the ends of the lines drawn from these points we have what is termed a sine curve. The value of the lines, of which $B'b_1$ is typical, gives

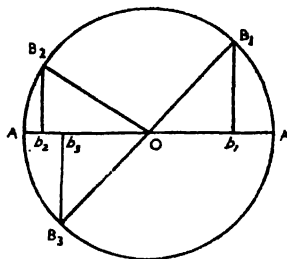


FIG. 5

the instantaneous value of the current. By comparison of these figures, it is clear that b_1B_1 is proportional to the sine of the angle through which OB_1 has rotated, and hence $C = C_0 \sin \theta$ (where θ is this angle,

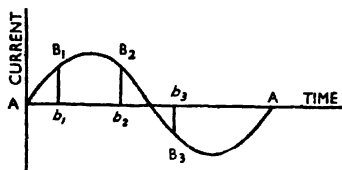


FIG. 6

and C_0 is a constant whose value represents the maximum instantaneous current. Similarly if E is the E.M.F. at any instant and E_0 is its maximum value, $E = E_0 \sin \theta$. We have neglected the question of self-induction so far. This occurs in most circuits. In this case the current does not rise and fall simultaneously with the E.M.F. but has a certain amount of lag depending upon the self-induction. As a result, the maximum of E.M.F. and that of current do not occur simultaneously and hence the direction of the E.M.F. reverses before that of the current, and thus for the moment the E.M.F. is acting against the current. This clearly will occur twice in a period, i.e. at each alternation. The lag is usually measured in degrees, its magnitude being called the 'angle of lag.' The power developed in the circuit is obtained by multiplying together the virtual voltage and amperes, and also the cosine of the angle of lag. The ratio of this to the product of the number of volts and amperes in a circuit free from induction is called the *power factor*. To explain this self-induction consider a coil of wire; when a current commences to flow in the circuit there is an

increase of lines of force through the coil, and this variation of the number of lines causes a current to flow through the coil in the opposite direction to the initial current, thus retarding its rise. On stopping the current there is again a variation in the number of lines of force through the coils, and this, causing electric induction, sets up a current in the same direction as the original current, thus retarding the fall of the current. The magnitude of the induced current will depend on the number of turns in the coil, its shape, and the strength of the current. Thus, the self-inductive effect or 'inductance,' which is measured in units called the *henry*, tends to retard the rise or fall of the current. Thus it is clear that when an alternating current flows, this self-inductive effect is brought into play at each alternation, and so the current will not only lag behind the E.M.F. applied, but its value will be lower than it would be in the absence of self-induction. It is therefore evident that two quantities offer obstruction to the passage of the current, viz., the resistance of the coils and the self-inductive effects, the total obstruction being called the *impedance* of the circuit. Under electro-magnetic induction, it has been pointed out that the current induced depends upon the rate at which the lines of force cut the coils, hence in the case of an alternating current it will depend on the rate of the alternation. Expressed mathematically, the impedance of the circuit = $\sqrt{R^2 + (2\pi n)^2 L^2}$ (where n gives the number of alternations per second, L the coefficient of self-inductance, and R the resistance). Hence $C = \frac{E}{\sqrt{R^2 + (2\pi n)^2 L^2}}$

(where C is the virtual current and E the virtual voltage).

Measurement of alternating currents.—Three types of instrument are widely used. In the moving iron type of ammeter two short rods of iron or other easily magnetised material are placed side by side in a coil through which the current flows. One rod is fixed; the other is supported from an axle to which the pointer is attached, and the movement of this rod is opposed by a helical spring. When a current flows through the coil the two bars become magnetised, and, irrespective of the direction of the current, they repel one another with a force whose magnitude is a measure of it. This type of instrument is convenient, but cannot be used if the frequency of the alternating current is high; a hot wire ammeter is then used. In this the whole, or a fixed fraction of the current passes through a fine wire and heats it; the temperature of the wire depending upon the value of the current. The expansion arising from the heating of the wire is used in one kind of hot wire ammeter as a measure of the current. In the other type the temperature is measured by a thermocouple attached to the wire (see ELECTRICITY.—Thermo-electricity); the current generated by the thermocouple, and used as a measure of the alternating current in the wire is a direct one and so

can be measured by a moving coil type of galvanometer or milliammeter (see GALVANOMETER).

Choking coils in a simple form consist of a coil of wire with iron cores to increase the self-induction. They are used in the alternating current circuit to reduce the current strength, or to reduce the fall of potential or pressure between any two points. Their great advantage is that, since they are designed to possess great self-induction, the current is choked and the energy is not wasted in the production of heat, but the major part is given back to the circuit. Occasionally it is necessary to vary the self-inductive effects. This may be conveniently done by using a core consisting of a bundle of straight iron wires, this core being capable of being withdrawn from the coil to a varying extent, and thus causing a variation in the self-inductive effect. The iron core is made of a bundle of iron wires to reduce eddy currents which would necessitate a waste of power due to the heat so developed.

The effect on the capacity of a condenser.—If a condenser is charged by an alternating current, it becomes charged in opposite directions as the current reverses; thus a current due to the charge on the condenser tends to flow in the opposite direction to that of the primary current. This current from the condenser is of the alternating variety. The E.M.F. of the primary current assumes a zero and a maximum value; when the value is zero, there is no E.M.F. acting against that of the condenser, and thus the current from it is a maximum. Similarly, when the primary E.M.F. is a maximum, this current will be a minimum. Here we consider practically no resistance in the external circuit and thus we see in this case the phase difference between the E.M.F. and current is 90° . This effect is of very great importance on the question of cable circuits. The cable acts like a condenser, and therefore this effect might assume great proportions. This is minimised by making the capacity of the cables as low as possible. See E. W. Golding, *Electrical Measurements and Measuring Instruments*, 1940; A. E. Clayton, *Alternating Currents*, 1934; A. T. Dover, *Theory and Practice of Alternating Currents*, 1944; J. R. Barr and D. J. Bolton, *Principles of Direct-Current Electrical Engineering*, 1943.

Electric Coherers, see WIRELESS TELEGRAPHY.

Electric Condensers, see CONDENSER, ELECTRICAL.

Electric Conductors, see CONDUCTION; ELECTRICITY.

Electric Distribution, see ELECTRIC SUPPLY. See also HYDRO-ELECTRIC POWER.

Electric Furnaces, see FURNACES; METALLURGY.

Electric Fuses, see ELECTRIC LIGHTING.

Electric Generator. A machine which converts mechanical energy into electrical energy. All machines that generate electricity are based on the fundamental principle that a current is produced in a conductor moving transversely to the

lines of force in a magnetic field. Basically an E. G. consists of two parts, the field magnets and the armature. The field magnets are arranged around a rotating armature, or rotate within a stationary armature.

Alternating Current Machines (Alternator).—A simple type is shown in Fig. 1. Conductor ABCD is rotated in a strong

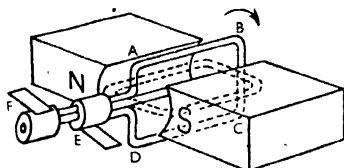


FIG. 1

magnetic field provided by the bar magnets N. and S. Considering conductor AB in the position shown it is cutting the minimum number of lines of force, therefore the E.M.F. induced is at a minimum. After revolving through 90° , AB is cutting the maximum number of lines, therefore the E.M.F. is at a maximum. During this period of rotation the current will be flowing from D to C and B to A. After another 180° of revolution the part CD of the conductor will be occupying the position now held by AB, therefore it will be seen that the direction of the current will be reversed: i.e. the flow will now be from A to B and C to D. The E.M.F. at the slip rings is composed of the E.M.F.s in AB and CD added together since they may be treated as separate conductors joined by wires BC and DA. (These latter connections do not affect the total E.M.F. since they merely slide through the lines of force and do not cut them.) From the foregoing explanation it will be seen that the E.M.F. rises from zero to a maximum in one direction, falls to zero and rises to a maximum in the opposite direction, then falls again to zero in one revolution, i.e. 1 cycle. The frequency being directly proportional to the speed of rotation. This alternating current (a.c.), is collected from the moving conductor by slip rings and brushes E and F. Modern alternators essentially consist of (1) the stationary armature or stator and (2) a rotating field magnet system called the rotor. It is now general practice to rotate the field magnets rather than the armature windings, because this simplifies construction and furthermore with the high voltages universally adopted with a.c. systems, stationary armature windings can be more satisfactorily insulated. Another important point is that the current generated is taken direct from the stator terminals without the necessity of sliding contacts, such as slip rings. The field magnets are energized by a low voltage direct-current generator, called the exciter, usually direct coupled to the alternator shaft. The current is supplied to the magnet coils through carbon

brushes bearing on insulated metal rings on the alternator shaft, and connected to the magnet coils. The armature core consists of thin, soft iron laminations securely fixed to the stator frame, and slots are provided into which the armature coils are fitted. The number of slots per pole is usually six, in order that the same design of lamination may be used for single, two- and three-phase alternators. Further reference will be made to this later. The rotating magnet system for low-voltage, low-speed alternators, usually comprises a series of field magnets, mounted on a cast-iron yoke, in this case the pole cores are of solid steel, but for medium and high voltage machines laminated poles are employed. The armature windings of a direct-current generator are uniformly distributed over the periphery of the core, but in the case of the alternator the windings are arranged around the stator core as a series of coils, equal in number to the field poles on the rotor. The spacing of the coils also bear a definite relationship to the pole-pitch of the field magnets, so that the E.M.F.s induced in each of the series of coils shall simultaneously attain their maximum values. In other words, the changes in the induced E.M.F. in each of the series of coils must be in step or phase.

Present-day alternators may be divided into three classes, viz.: (1) single-phase machines; (2) two-phase machines; (3) three-phase machines. By far the most important are the last two classes.

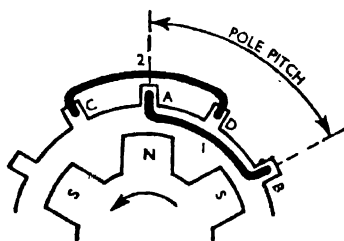


FIG. 2

Referring to Fig. 2, if we have a coil (1) wound in slots A and B, then the induced E.M.F.s in the conductors A and B will be equal and opposite in direction, and the total E.M.F. induced in the coil will be twice that of either conductor. At the instant when the poles N. and S. are immediately under the slots occupied by A and B, the induced E.M.F. will be a maximum, and as the field magnets continue to rotate, the induced E.M.F. in the coil will fall to zero. Further rotation will cause this induced E.M.F. to build up to a maximum of opposite polarity, and again fall to zero and then build up to a maximum when the slots A and B are again immediately over poles N. and S. respectively. This cycle of change in the induced E.M.F. is represented by the curve in Fig. 3. Now let us consider what

is happening simultaneously in coil 2, which is angularly displaced from coil 1 by half the pole pitch. The induced E.M.F. in coil 2 will pass through the same cyclic changes as that in coil 1, but

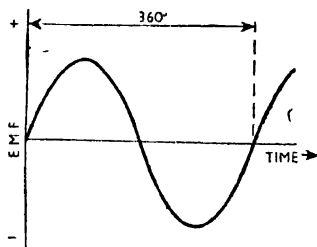


FIG. 3

at the instant when the E.M.F. in coil 1 is a maximum, the E.M.F. in coil 2 will be zero. Thus, the two E.M.F.s will have a phase displacement of a quarter of a period, or 90°, as shown in Fig. 4. If

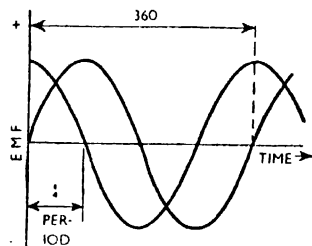


FIG. 4

then we have a series of coils such as 1 arranged around the stator and connected together to form a winding, the alternator will be a single-phase machine. By the addition of an independent series of coils 2

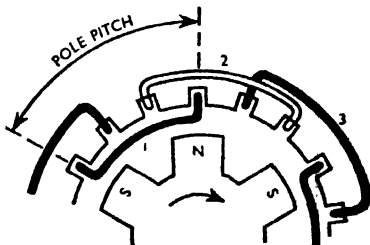


FIG. 5

displaced relative to the first set by half the pole pitch, the same alternator will be capable of generating two distinct alternating E.M.F.s, having a phase displacement of 90°. Such an arrangement

constitutes a two-phase alternator winding. The introduction of this second series of coils utilises space around the stator core which otherwise would be mixed. In a three-phase alternator there are three distinct windings arranged

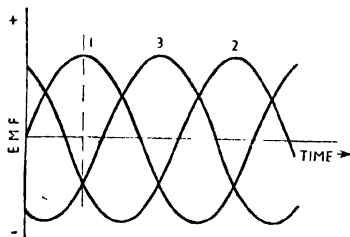


FIG. 6

around the stator core as shown in Fig. 5. The induced E.M.F.s therein have a phase displacement of 120° as indicated in Fig. 6. Large three-phase alternators

current in one direction only as shown in Fig. 7. The brushes span the segments when the E.M.F. in the conductors is at zero (6). Dynamos are constructed with a rotating armature, consisting of a soft iron core with axial slots containing the coiled conductors, the ends of which are connected to the commutator segments. The field magnet system is stationary and consists of a heavy cast iron yoke with pole pieces projecting inwards towards the armature, the field coils are wound on these poles. Dynamos are classified by their field winding connections, there being three types. (1) series wound dynamos; (2) shunt wound dynamos; (3) compound wound dynamos.

Series wound dynamos.—Field connections shown in Fig. 8. As the armature current rises with an increase in load the field current also rises, since both are connected in series. This causes a stronger magnetic field and consequently a rising characteristic of the voltage curve as shown in Fig. 8. If the field current is such as to saturate the iron any further increase in load will cause a drop in voltage. This is mainly due to an increase in the armature demagnetising effect

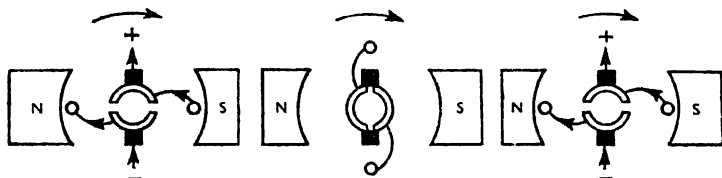


FIG. 7

have been constructed for direct generation at 33,000 volts for outputs up to 40,000kw.

Direct Current Machines (Dynamos).—This is basically similar to the simple

without a corresponding increase in field strength. In order to vary the field strength, i.e. the output voltage, it is usual to connect an adjustable resistance

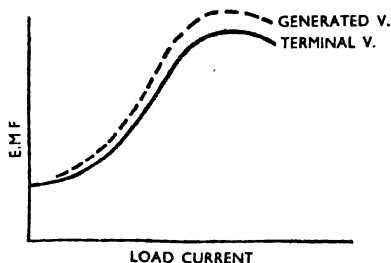
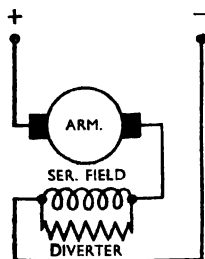


FIG. 8

alternator shown in Fig. 1 except that whereas the current reverses in direction in the alternator, in the dynamo the slip rings are modified and become a rotary switch or commutator, which picks up the

or diverter in parallel with the field winding. This type of machine finds but very little use as it is quite unsuited for dealing with variable loads. It is essentially a constant current machine and was

used in the past for supplying current for arc-lamps on the series system where the load was steady and the voltage not critical.

Shunt wound dynamos.—Field connections are shown in Fig. 9. The field winding in this case is connected directly across the brushes. A rheostat is usually

equipment requires a dynamo for battery-charging purposes.

Compound wound dynamos.—Field connections are shown in Fig. 10. The field windings in these machines are separate in so far as there are two distinct types, a heavy series winding connected in series with the armature and a lighter shunt

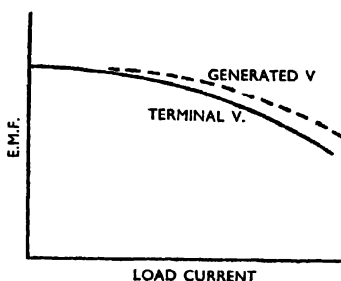
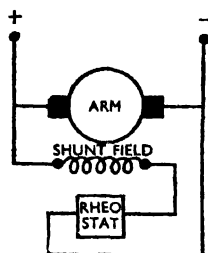


FIG. 9

inserted in the field circuit for controlling the field current and therefore the output voltage of the dynamo. The terminal voltage is a maximum on open circuit and diminishes as the load increases. This drop is due to armature voltage drop caused by an increase in armature current, the demagnetising effect on the field

winding connected across the brushes. The shunt winding maintains the voltage at no load and the series winding provides additional field strength to compensate for the voltage drop on load. It will be evident that by suitably proportioning the series winding in relation to the shunt winding, the voltage characteristic can

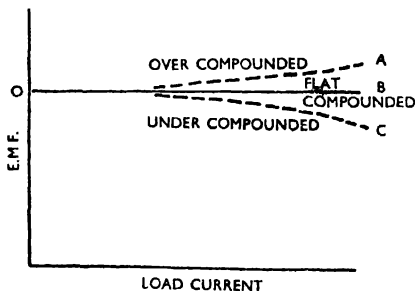
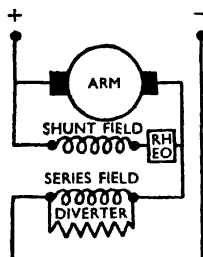


FIG. 10

strength of the increased armature current and the reduction in the field current consequent upon the lower terminal voltage caused by first two reasons. A characteristic curve for a shunt wound dynamo is shown in Fig. 9. These machines are suitable for steady load conditions and where the voltage variation is not of great importance. They are generally used for exciting the field windings of alternators and rotary converters. Also they are used for battery charging purposes. Perhaps there are more shunt wound dynamos in the world than any other type because every car and lorry that has electrical

to a great extent be controlled. Fig. 10 shows characteristic curves for a compound wound dynamo. When the series winding is arranged just to compensate for the voltage drop as a result of increasing load, the machine is said to be flat-compounded and a practically straight line OB is obtained. If the series winding is insufficient the voltage curves will 'droop' at the higher loads OC, and the machine will be under-compounded. On the other hand, should the series winding be greater than is required for flat compound, the machine is said to be over-compounded, and the voltage will rise as the load increases, as indicated by curve

OA. When a dynamo is required to supply power at some distance overcompounding is necessary to compensate for the increased line voltage drop at the higher loads. In this way the voltage at the load terminals can be maintained practically constant. See H. Cotton, *Design of Electrical Machinery*, 1934; M. G. Say and E. N. Pink, *The Performance and Design of Alternating Current Machines*, 1943; A. E. Clayton, *The Performance and Design of Direct Current Machines*, 1945; A. J. Coker, *AC Motors and Control Gear*, 1945.

Electric Heaters, see under ELECTRIC LIGHTING.

Electric Indicators, see ELECTRIC BELLS.

Electric Insulators. As defined in ELECTRICITY, an insulator is a body which does not allow electricity to pass through it. Metals, solutions of salts, water, and alcohol are not insulators. It is found that the best insulators are dry ebonite, glass, shellac, sulphur, silk, paraffin, sealing-wax, and many other fats, oils, and resins. All gases are insulators unless they are under the influence of Röntgen rays or great heat. It is found that a little moisture is detrimental to a substance's insulatory properties. Thus the glass of a Leyden jar is coated with shellac varnish, otherwise it would become covered with a conducting film of moisture. The stands and supports of all electrostatic and electromagnetic machines are insulators. Marble, glass, and porcelain are most commonly used for this purpose in large instruments. In small machines and laboratory appliances, ebonite is often used. The insulating supports on telegraph wires are made of porcelain. Submarine cable wires are insulated from each other by surrounding them with gutta-percha. This is then surrounded with tarred hemp, and then with hemp dipped in an insulatory composition. This keeps the cable insulated from the seawater, which is conducting. On a small scale silk and cotton are used for covering wires and bobbins of electrical apparatus. In electrical heating appliances, where great heat and strain are encountered, mica is the substance usually employed for insulating any material. For insulating purposes in very delicate instruments quartz or silk fibre is used. The latter is quickly affected by the damp, but the former is not. See *Electric Insulating Materials* by A. Monkhouse, 1926; and by H. Warren, 1931.

Electric Lamps. The first attempt to apply electric power to lighting purposes resulted from the discovery by Davy in 1810 that when the terminals of a powerful battery are connected to two pieces of carbon, the current continues to flow when the ends of the two carbons are not in contact. A brilliant light is emitted when this takes place, termed the electric arc. The gap between them is filled with an intense glow. Particles of carbon are projected from the positive terminal and float about freely in this space; these become intensely luminous. A chemical effect also takes place when the carbons are exposed to the air, resulting in the

carbons gradually being burnt away. The effect of the positive carbon throwing off these particles is shown in Fig. 1, where the point of the carbon assumes a hollow form like a crater. This crater is the source of most of the light emitted. Owing to the combined action of these effects, the distance between the points of the carbons increases, and ultimately the gap will be too great for the current to pass. Modern electric arc lamps attempt in various forms to overcome these difficulties automatically. The general method is to pass the current through an electro-magnet which is connected in series with the lamp; when the magnet is excited it attracts an armature, the motion of which is utilised to adjust the distance between the carbons. The brush lamp, illustrated in Fig. 2, exemplifies these principles. T₁ and T₂ are the terminals by which the lamp is connected into the main circuit.

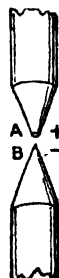


FIG. 1

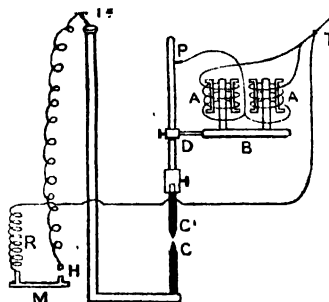


FIG. 2

The negative carbon C is fixed, while the carbon C' is movable, its movement being regulated in a manner to be described, so that as the carbons gradually waste away the arcing distance is adjusted. The current enters at the positive terminal T₁. It then travels through the solenoids A and A so as to give very powerful and opposite poles at the lower extremities. The currents then unite and travel through the connection P to the positive carbon C', thence to the negative carbon C which is connected to the negative terminal T₂. Now consider the action of the lamp, the carbons being initially in contact: the current passes through the solenoids A, causing the soft irons B to be drawn upwards, B is connected to the arm holding the positive carbon, and thus the movement is transmitted and the carbon is raised. This results in an increase of resistance in the main circuit, and thus more current travels through the coils A, and the magnetic force is increased. Thus the distance would continually increase until the current ceased. To obviate this,

another coil of thick wire, not shown in diagram, is wound around the coils A in opposite directions to the main coils on A, causing a diminution of the intensity of the magnetisation of the irons B, and so B falls a little. In this way the distance between the carbon points is kept at the proper arc distance. This is the main principle of the lamp, but in actual practice the mechanism is far more complex than that described above. When a number of arc lamps are used they are mostly connected up in series. A difficulty arises from the fact that if any one of the lamps fails to act, the whole group is cut off from the current. A device is introduced whereby the lamp on failing to act becomes short-circuited, the current taking up a new path through the lamp.

Incandescent lighting.—The principle underlying most phases of lighting is that of heating a body to a very high temp. It has been noted under ELECTRICITY that one of the effects of passing an electric

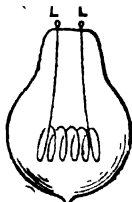


FIG. 3

current through a body is the production of heat. Further, the greater resistance which the body offers the greater the heat produced. Clearly it is necessary to use a substance which has a very high melting-point. Edison introduced the system of using a long carbon filament enclosed in a glass globe which is exhausted of air as completely as possible. This type of lamp is illustrated in Fig. 3. The filament is now generally made by forcing a solution of cellulose through a very fine pipe. When the filament is dried, it is reduced to a uniform thickness by forcing it through jewel dies; it is then transformed into solid form by the process of carbonising. Carbon is an exceptionally good absorbent of gases. As the temp. rises these gases expand and force their way out, thus causing small holes in the carbon. It is necessary to diminish this tendency in the case of filaments and thus the process of carbonisation takes place at a very high temp. It is then subjected to the process of 'flashing' to correct further this fault. The filament is first cut to the required size and then connected to the terminals of a dynamo. It is then surrounded by coal gas and is traversed by currents sufficient to raise it to white heat. The gas is decomposed to a certain extent and carbon particles are deposited in the filament. If the filament is not of uniform cross section the heat developed in

the different parts will vary, and so decomposition of the gas will be greater at the places of highest temp. A greater quantity of carbon will thus be deposited on the thinner parts of the wire. The process of flashing is continued until the whole filament assumes a uniform temp. It is then placed in a partial vacuum and a continuous current passed. In this way the filament is hardened, its resistance is decreased, and its absorbent properties practically destroyed. The efficiency with which an incandescent filament lamp can convert electrical energy into light depends upon the temp. at which the filament is run, and increases rapidly as this is raised. With increasing temp. the emitted light also becomes more like the white light from the sun, so for both these reasons the filament temp. should be the highest that is practicable. On the other hand it must not be so high that the filament melts or is vaporised rapidly. The latter condition is that which limits the temp. in practice because evaporation becomes serious at temps. far below the melting points of suitable materials, and evaporation not only reduces the working life of the lamp but also reduces its efficiency since the evaporated material is deposited as a semi-opaque film on the interior of the glass envelope. In most modern lamps tungsten is used instead of carbon as the filament material as it permits the use of higher temps. In the earliest tungsten lamps, as in carbon filament ones, the glass bulb was evacuated to prevent oxidation of the filament, but the modern practice is to fill them with an inert gas (argon, containing a small admixture of nitrogen). Evaporation is thereby reduced, and the evaporated material is also carried by convection currents in the gas to the top of the lamp, where its deposition does not interfere with light emission. Since tungsten is a metal, and hence a good conductor, the filament must be longer and thinner than a carbon one, and in the gas-filled lamp it is wound into a close coil which may then be further coiled on itself. This construction reduces to a minimum heat losses by gaseous convection, and so increases the efficiency further. The current to and from the filament is carried by wires sealed through the glass envelope, the wires being of an alloy chosen as suitable for this, and the seal is protected by the familiar bayonet cap. To reduce glare from the lamp the glass bulb is frequently frosted (i.e. roughened) on its interior surface.

Discharge lamps.—In lamps where electrical energy is used to heat a solid to incandescence the efficiency is never high, because the greater part of the energy radiated is emitted as invisible infra-red radiation. Higher efficiencies can be obtained if the light is produced by a current through a gas or vapour at a suitable low pressure, as in neon signs and the mercury or sodium lamps used for street lighting. For ordinary purposes the colour of the light so obtained is objectionable, but white light or light of a colour that is desired can be produced

by such discharge lamps if the internal walls of the discharge tube are coated with a thin layer of a suitable fluorescent material. When the current flows through a column of mercury vapour, for example, some light of particular colours is emitted, and also some invisible ultra-violet radiation. The latter is absorbed by the fluorescent material on the wall of the tube, but causes it to emit other radiation of the visible spectrum. By a suitable choice of fluorescent material a brilliant white light, or light of some desired shade can be obtained. Fluorescent lamps of this type are more expensive than filament lamps, are less compact, and require subsidiary apparatus to provide the higher voltages required for starting them up. They are, however, more efficient, have longer working lives, and are free from glare because the light is emitted from a relatively large surface. The intensity of the light emitted from a fluorescent lamp fluctuates with a frequency similar to that of the mains supply, and special arrangements for safety purposes are therefore required if they are used to illuminate a room containing running machinery. See L. B. W. Jolley, J. M. Waldram, and G. H. Wilson, *The Theory and Design of Illuminating Engineering Equipment*, 1930; H. Cotton, *Electric Discharge Lamps*, 1946.

Electric Lighting and Wiring of Houses. This consists of setting up a system of wires from the main circuit to all the electrical apparatus contained in the house,

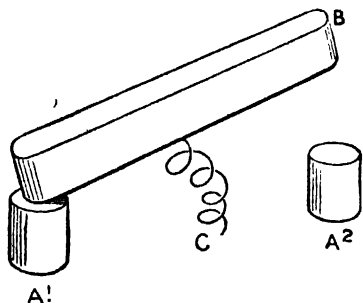


FIG. 1

e.g. lamps, heaters, etc. To make a circuit along which the current flows, there should be a continuous line of conductors, any break in which will stop the current. These breaks or gaps are a necessary feature of the system, in order that the supply may be controlled. These gaps consist of a mechanism called a *switch*. The rough description of this mechanism is that it consists of two brass blocks insulated from one another, each being the terminal of a wire. A brass lever is so adjusted to make or break contact with both blocks, thus making or breaking the circuit. To minimise sparking when contact is made or broken, the lever is made to work automatically so that its action is practically instantaneous. Fig. 1 gives

a rough illustration of a switch. A¹ and A² represent the brass blocks, B the lever fastened to A¹, and C a spring. B is pressed down from above to make contact with A²; when the pressure is released B immediately breaks contact by the action of the spring C.

Fuses.—One of the chief properties of a current flowing through a wire is the production of heat. When too great a current is allowed to flow, the heat developed may be enormous, and thus cause damage to the insulating material. The danger of over-heating is minimised by using thick wires. Another, and the mostly employed, contrivance is the *fuse*. This consists of a very thin wire fixed in a box which will not burn. Being so much thinner than the cable, the heat is developed at a faster rate, and the temperature is soon high enough to melt the wire; this causes a break in the circuit and thus any further damage is prevented. This wire is generally three or four in. long; the best material for its construction is fusible metal (an alloy of tin and lead), owing to its low melting point, and thus the molten metal itself is not so destructive. As a matter of practice all the

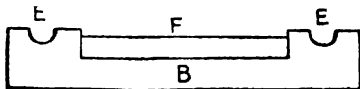


FIG. 2

fuses are located in the same place. The main cable is attached to a brass bar; the distributing cables are attached to brass blocks opposite, these being insulated from one another on an earthenware base. Thick brass arms effect the junction at this point. Fig. 2 represents such a bar. B is the brass arm and F the fuse. The ends E fit into the brass blocks. In this way the arm B can be taken out of the circuit and the fuse easily renewed before it is replaced. The system of wiring is practically independent of the voltage of the supply. The function of the system is to afford a complete circuit for the current from the source through the various apparatus back to the source. The wire used generally consists of a core of wire strands, insulated by a covering of rubber (pure and vulcanised) and then a layer of tape which has been soaked in bitumen. A most important feature of the system is to note the occurrence of *leaks and short circuits*. Of two paths a current will choose the one of least resistance, and if the outgoing wire and the return wire *both together* come into contact with earth, the earth being a good conductor, the current will take the earth circuit rather than the various apparatus. Thus the necessity of good insulation. If the leak is great an electric arc may be developed, and a great deal of damage caused. A short circuit is made when the outgoing and return wires make contact with one another. If the voltage is high, this is accompanied by an intense flash and a

great evolution of heat, and the current immediately ceases. These short circuits are of very frequent occurrence. The electricity meter is placed on one of the mains which come from the town main, and thus all the electricity utilised passes through it and is measured. Switches are placed near so that the house may be cut off the t.n. mains. One method which was frequently adopted was that of two mains leading from the switchboard and various branches being made off to the lamps. This necessitated a large number of joints, which, to a large extent, spoiled the insulation and also increased the number of fuses, since these must be placed wherever the size of the wire varies. To overcome this, the wire is now made the same thickness all through, and a few lamps are attached to each wire. In this way the number of joints and fuses is greatly decreased. The cables themselves are encased in a lead covering to exclude moisture. They are generally fixed on the walls.

Fittings include the various devices for connecting the lamps, etc., to the cables, and for their support. In ceiling fittings, the cables enter at a broad flanged base

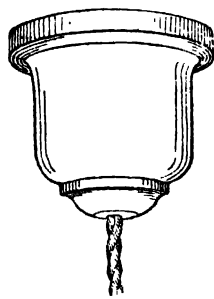


FIG. 3

and pass down to the connecting screws of the lamp. Several lamps are often connected at the end of these cables on the same fitting. The most generally used fitting is the pendant. A small porcelain box is screwed on a piece of wood on the ceiling. This contains two brass terminals insulated from one another by porcelain. The cables which lead in from the base are attached to these terminals. To these terminals a pair of flexible cables are attached, these are twisted together and passed through a hole in the bottom of the porcelain cap. This cap is fixed to the ceiling as shown in Fig. 3. The cords hang downwards, and to the ends the lamp is attached. Another fitting is the bracket which is attached to the wall; it consists of several short arms at the end of which a lamp is suspended. A very useful contrivance for portable instruments, such as reading lamps, etc., is the wall socket. The socket is similar to the above-described porcelain cap, but it has two holes which contain brass tubes

attached to the cables. The plug is also a porcelain cap containing two insulated brass terminals to which two brass pins are attached which fit the brass tubes in the socket. Flexible cords are attached to the terminals, and at the other end to a lamp. The current is supplied to the lamp by pushing the pins into their corresponding sockets.

Electric heaters.—The development of heat due to the passage of a current is utilised in these appliances. The wire is generally contained in enamel, against which the body to be heated is placed. They have the advantage that little heat is wasted, and are free from smoke and the various other inconveniences caused by the process of combustion which underlies the numerous other types of heating appliances.

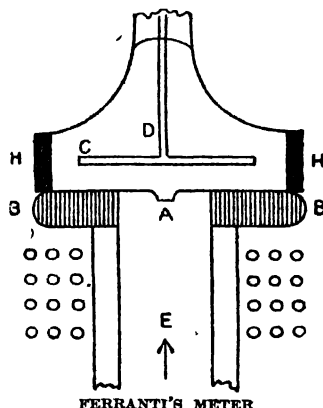
There are five different systems of wiring. They are: (a) Vulcanised India rubber (V.I.R.) in steel conduit; (b) V.I.R. in lead sheathing; (c) V.I.R. in wood casing; (d) V.I.R. on porcelain cleats; (e) rubber-sheathed cables. Of these five methods the first two are those most employed in house wiring; the third method is used chiefly in public buildings, offices and schools; V.I.R. on porcelain cleats is employed in factories and workshops where the wiring is of a temporary nature and has to be fastened on steel girders. Rubber-sheathed cables have a marked advantage over others in that they are not so greatly affected by moisture; thus they are used in public baths, laundries, boiler-houses and other places where there is always a large amount of moisture in the air. Steel conduit may be employed either to screw together or to be connected by spring collars. More skill is required to instal screwed conduit, since it involves the use of taps and dies and the lengths of conduit have to be cut accurately, and also it is hard to bend. One disadvantage of this method is that if there are many cables in the same conduit and one of them catches fire, either by earthing on to the conduit or by a short circuit, all the other cables are also destroyed. Lead-covered cable is the simplest to instal, in that it can be run along woodwork or brickwork on the surface and can be easily painted over to hide it; moreover it bends easily and can be made to conform readily with the contour of a wall or ceiling. This latter point is very important, as it makes the wiring of old houses possible since wires can be bent out of sight. Wood casing is resorted to only where wiring has to be carried out on the surface of walls, and where long lengths of it are to be visible, when wood casing made to resemble picture rails is employed and is painted or discoloured to match the walls. This type of wiring needs great skill, as each corner has to be accurately cut in order to avoid unsightly joints. Cable on porcelain cleats has the great advantage that it is easily and rapidly erected, and that when a break occurs in the wiring it is easily seen and repairs quickly effected. For minor faults in household systems see under HOUSEWIFERY.

Electric Meters are used to measure (1) the strength of an electric current at any time, or (2) the quantity of electricity supplied, or (3) the quantity of electrical energy supplied.

Ammeters and voltmeters.—The heating or magnetic effects of an electric current may be used to measure it. In *Siemens'* electro-dynamometer there are two coils, one fixed and one movable, at right angles to each other and in series. The movable coil carries a pointer which moves over a horizontal (limited) scale. When the current passes, the movable coil is displaced, but is brought back to the original position by twisting it by means of a torsion head. The angle of twist varies as (current)². Thus the current can be found. The expansion of a wire when heated by a current can be used to measure the quantity passing per second. In *Lord Kelvin's* current balance the attraction between coils through which a current is passing in opposite directions is measured against a mechanical force, and thus the current strength is measured. The *Weston ammeter* is essentially a suspended coil galvanometer (q.v.). The instrument is usually shunted. If the magnetic field is uniform, the deflecting couple varies as the current. *Lord Kelvin's* ampere gauge consists of a fixed coil and a piece of soft iron wire carrying a pointer which moves over a horizontal scale. When a current passes in the coil, the iron wire is sucked into it, and the motion of the pointer measures the current. The amount of silver or copper deposited from their solutions can be used to measure quantity of electricity. In this case the instrument is called a *voltmeter*. *Weston's* instrument may be used as a *voltmeter* by removing the shunt and adding a high resistance of low heat coefficient in series.

Wattmeters and supply meters.—The power supplied is equal to the product of the E.M.F. and the current. The energy supplied is equal to power multiplied by time. A wattmeter measures the power supplied, and is essentially a combination of an ammeter and a voltmeter. The best known form is *Weston's*. A fixed coil of low resistance (the current coil) corresponds to the ammeter. The field due to this coil varies as the current (C). A coil of high resistance (the pressure coil) swings in this field. The current in this coil is proportional to the potential difference (P.D.). Thus the deflection is proportional to $C \times P.D.$, i.e. to the power. If the current is alternating the deflection varies as the mean power. **Supply meters** are of two kinds: *quantity meters* and *energy meters*. If the P.D. in an electrical supply is practically constant, then the power varies as the current, and the energy as the quantity. Thus, any wattmeter used in such a system becomes a quantity meter for measuring energy. If in a meter it is so arranged that the energy supplied is read directly, this would be an energy meter. *Electrolytic meters* can be used to measure quantity of electricity. *Edison* used silver and copper voltameters. In the *Bastien* meter water is electrolyzed by the current. The rate of loss of water

measures the quantity of current passing. This rate of loss can be read directly. In the *Wright meter* mercurous nitrate is used as the electrolyte. Here the polarisation is small. Mercury forms the anode, and a platinum cone the cathode. Mercury dissolves at the anode and is formed at the cathode, from which it falls to the bottom of the vessel. The vessel is graduated so that the volume of mercury in the bottom can be read. The mercury automatically siphons off when it reaches a certain height, so that the quantity formed in a given time can be measured, and thus the quantity of electricity passing can be estimated. *Motor meters* are another form of meter. The diagram



shows a sketch of *Ferranti's meter*. BB is an electro-magnet with a steel core E. This forms a uniform field inside an iron ring HH. This space is filled with mercury, in contact with the electro-magnet only at a point A. A light fan C is suspended in the mercury. The current passes along E, to the mercury through A, and then radially to the ring HH. This causes the mercury to rotate, taking the fan with it. The driving force varies as the (current)². The fluid resistance on the fan varies as the (speed)³. Thus, the speed of the fan varies as the current, and the number of revolutions varies as the quantity of electricity. In *Chamberlain* and *Hookham* meters a copper disc is placed in the mercury. The current causes it to rotate. A 'brake disc' is attached to rotate at the same spindle. This rotates in a non-uniform field. Eddy currents are set up, giving a retarding couple varying as the speed. Thus speed varies as the current.

Alternating current meters.—The *Siemens'* electro-dynamometer and the wattmeters described can be used for alternating currents as well as direct currents, with a little modification. Alternating supply meters fall into two classes: (1)

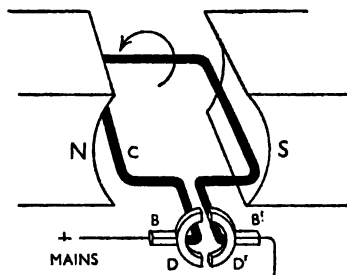
Motor meters, (3) clock meters. Of the second class the *Aron meter* is the best known. It consists of two clocks electrically driven. A coil is suspended below each clock. The current in these coils is in such a direction that the speed of one clock is retarded and that of the other increased, due to the magnetic action on the pendulums. The difference is measured by means of a differential gear. This difference varies directly as the energy supplied to the system, and is read off by the rate of translation of the differential gear. This method can be used for one, two, or three phase currents. *Motor meters* consist of small motors. The field coils carry the whole current, the armature only a shunt current; a resisting torque varying as the speed of the armature is supplied by a 'brake disc.' The number of revolutions of the armature then measures the energy supplied. Blatby and others used two coils for alternating currents, one of thick wire carrying the whole current, and another of fine wire carrying a current varying as the pressure applied, so designed that the current lags 90° behind the pressure. A rotating field produced, giving eddy currents in a suspended disc, which then rotates. Speed of rotation varies (after a magnetic brake is applied) as the power. Thus the number of revolutions varies as the energy supplied. For measuring small alternating currents, especially when the frequency is high (as in radio practice), a thermocouple is used to measure the current in conjunction with a resistance. The resistance is put in the main circuit whose current is to be measured; one junction of the thermocouple is fixed to this resistance, and the leads of it connected to a milliammeter (an ammeter calibrated in thousandths of an ampere); the other junction is connected to a point at constant temp. The heating effect of the resistance sets up a current in the thermocouple circuit which varies with the current passed through the resistance.

There are many types of meters; they are divided into two main kinds, (a) switchboard meters, and (b) portable meters. The switchboard meters are themselves divided into two types: the 'flat' instrument, which is comparable to a flat clock-face; and the 'edgewise' instrument, in which the readings are shown on the edge of a rotating drum. Recording instruments are those which in place of the usual pointer have a finger with a small ink pen attached, and this pen is trailed over a continuous chart of paper, which is passed under it by means of clock mechanism. The instrument is made more robust than the usual type, since the pointer has to overcome the friction of the pen on the paper and prevent sticking. See E. W. Golding, *Electrical Measurements and Measuring Instruments*, 1940.

Electric Motors. In a DYNAMO or ELECTRIC GENERATOR (q.v.) mechanical energy is supplied to the machine and electrical energy is supplied by it. In an electric motor the reverse process occurs; the electrical energy of a current, causes a rotor to rotate and turn a shaft, providing

a source of mechanical energy for driving other machines.

Direct Current Motors.—The principle of a direct current (d.c.) motor is illustrated in the diagram. Current from the mains flows to the carbon block B (called a brush), passes thence to the split ring commutator at D, round the flat coil C, and back to the mains via the other part D' of the commutator and the brush B'. The commutator and coil are mounted on an axle and can rotate in the direction shown by the arrow, and the coil lies between the fixed poles N, S. of a magnet. When current passes round the coil the latter becomes, in effect, a flat sheet magnet with its faces acting as magnetic poles, and it therefore turns through 90° so that its poles are opposite those of the



ELECTRIC MOTOR

fixed magnet. In this position there is no resultant torque tending to cause further rotation, but we may suppose that its own momentum carries the coil past this position. It will be seen that the rotation of the commutator simultaneously carries the gaps in it past the brushes, so that current now enters and leaves the coil through D' and D respectively. The reversal of current through the coil causes a reversal of its magnetic polarity, so it turns through a further 180° to bring its newly formed poles opposite to those of the fixed magnet. This causes the current in the coil to be reversed once more, bringing about a further rotation of 180° , and so on. Such a simple machine as that described would be weak and jerky in its action. To make it more powerful and steady running it is necessary to modify it by using an electromagnet as the fixed magnet, by using a laminated iron core within the coil, by using a more complicated armature winding in place of the single coil, and by attaching this winding at various points to a commutator that is split into a large number of segments instead of the two shown. The number of fixed pole pieces may also be increased, and subsidiary poles may be placed between them for reasons similar to those explained under ELECTRIC GENERATOR. It will be seen that such a machine is similar to one type of dynamo, and just as the rotation of a dynamo armature

produces an E.M.F. in it, so the rotation of the armature of a motor sets up an E.M.F. This E.M.F. opposes, but does not prevent, the flow of current. Its value is zero when the armature is stationary and the machine is being started up, so for all but the smallest machines it is necessary (to prevent the flow of excessive current at this stage) to use a starting switch incorporating a resistance. As the speed of the motor increases, and its induced armature E.M.F. builds up, the starting resistance in the armature circuit is reduced to zero. D.C. motors may be classified as series or shunt-wound according as the coils producing the magnetic field of the stationary magnets are connected in series or in parallel with the armature. The series-wound type gives a powerful starting torque. Its steady running speed falls rapidly if the load on the machine is increased, or rises rapidly if the load is decreased. Such a machine should not be started without an applied load. The shunt-wound machine, on the other hand, should be started up without an applied load, and the load should be added after the motor has gained speed. Its running speed also decreases with greater loads, but less rapidly than that of the series motor, and is readily controlled by regulation of the current to the field coils; on account of its effect upon the induced E.M.F. in the armature an increase of the field strength causes the motor to run more slowly. For electric traction it is often arranged that the motors should act as series-wound machines during starting up, and be converted to shunt-wound machines for steady running.

Alternating Current Motors.—Alternating current (a.c.) motors can be divided into three groups, depending upon the type of rotor employed in their construction, viz. (a) synchronous motors; (b) asynchronous or induction motors; (c) commutator motors. Synchronous motors are merely alternators used as motors, and their constructions are identical. The number of poles on an alternator is determined by the speed at which it is to be driven, and similarly the speed of a synchronous motor determines the number of poles it shall have. Like alternators, synchronous motors require direct current excitation for their rotor poles, and this is performed in the same way as is done on alternators, i.e. by a direct-current generator mounted on the same shaft as the rotor. One serious drawback to the use of synchronous motors is that they are not self-starting, but have to be rotated at their normal speed before they can be started. The induction motor is by far the most common type of a.c. motor, because its construction is very simple. It is reliable, and can be made to start against a very heavy load. The rotor of an induction motor consists of a number of insulated conductors, arranged to form a drum, with the ends fixed together into a ring. The alternating polyphase current supplied to the stator winding sets up rotating fields of a uniform strength. These fields induce currents in the copper

bars of the rotor, and repulsion is set up between like poles, and the rotor will rotate in the same direction as the inducing field and try to keep pace with it, but it will never quite succeed. Commutator motors are mostly applied to domestic uses, as they are best used as single-phase motors, polyphase motors being too complicated in structure to be practical. The single phase motor is the same as the d.c. motor except that the poles of the former must be laminated and only series wound motors can be used.

Electric Potential, see CONDENSER, ELECTRICAL; ELECTRICITY—*Electrostatics*.

Electric Railways, see RAILWAYS.

Electric Ray, see TORPEDO.

Electric Power Generation. The modern power station has grown to dimensions undreamt of many years ago. The development of the steam turbine and the improvement in the methods of steam generation have made large alternators of the capacity of over 100,000 K.V.A. possible. The cycle of operations at the generating station is as follows: the coal is fed from hoppers down chutes on to an endless chain grate, which passes slowly into the combustion chamber of the boiler; the coal fires and heats the water in the tubes above it converting the water into steam; the heat rises, and to dry the steam and raise it to very high temps. it is fed back again through super-heaters. The steam is then passed into a separator to remove any impurities which may be in the steam and also any water which may inadvertently be carried along with the super-heated steam or which may be in the pipe when the plant is started up from cold. The steam then passes on its way to the turbine through a stop valve and a governor valve; it then enters the turbine and impinges on the blades of the wheels, and thus a torque or turning momentum is applied to the turbine shaft and rotates it. The turbine has directly coupled to it the alternator and the exciter for the alternator. The steam, after leaving the turbine at the low pressure end, passes into the condenser. Here the steam is cooled, condensed back into water, and is then passed on to the hotwell. From this hotwell the water is pumped back to the boiler tubes, and again passes through the cycle of operations. The alternator has all its controlling equipment on a panel on the main switchboard of the station, and all the leads are taken from the alternators to busbars behind the panel. From the panel the power is fed to switchboards, which in their turn feed the distribution system, by cable ducts, out into the streets. If the current distributed is of high voltage, the switchgear for each section of the distribution scheme is installed in a separate cubicle. The main cables from the alternators are run to a switch-house and each unit coupled separately to a common omnibus bar through a circuit-breaker. Each alternator unit, whilst in service and generating electrical energy, is protected by certain relays for earth and intermediate faults. Should any fault develop between the alternator and the omnibus bars the

relays operate and clear the circuit-breaker, thus protecting the machine. In a modern and up-to-date power station the circuit-breakers are entirely submerged in a very light oil in a cylindrical steel tank so that should one open on a fault, the oil will very quickly damp out the arc caused by the circuit-breaker opening. All circuit-breakers are usually operated some distance from the power station by a control engineer who closes a small switch which, in turn, operates a solenoid connected to the main oil circuit-breaker. This is called 'remote control operation.' Numerous pilot cables are run between the control switchboard and the switch-house to operate the main circuit-breakers. The alternator voltages are kept constant by automatic voltage regulators. These instruments, in spite of varying currents, enable the voltages to be maintained at constant pressure. See T. H. Carr, *Electrical Power Stations*, 1944. See also HYDRO-ELECTRICAL POWER.

Electric Power Transmission. E. P. T. lines are those which are used for transmitting relatively large amounts of power from one point to another as compared with distribution circuits which convey small amounts of electricity to numerous points. Power is generally transmitted at high voltages to reduce its loss in the lines. At the generating end, the voltage is stepped up by suitable transformers to the line voltage. It is then transmitted. At the load end there are transformers and converters which reduce the voltage down to one suitable for distribution. Most of the E. P. T. lines of the world are used in connection with hydro-electric schemes, where the power generated at the river-falls is transmitted to the large towns; the manufacturing area being surrounded by hydro-electric plants which supply the power. The converse of this system is where the large power station is situated in the manufacturing area where the costs of generation are least and lines radiate from it to supply the surrounding country. In Great Britain the various main generating stations are now connected together in the 'Electric Grid' (see ELECTRIC SUPPLY). But little E. P. is transmitted by long underground cables because of the cost; and, in the case of very high voltages, cables have yet to be made to overcome the insulation problem. Hence most transmission lines are overhead, and consist of two main kinds, steel-tower lines and wood-pole lines. The steel-tower lines are used where very high voltages are employed, and therefore are required to give greater ground clearance; lattice steel towers are also used because larger size conductors can be carried on them, and heavier current can be transmitted. Wood-pole lines are used for short lines in which the voltage is not as great as in steel-tower work. They are not designed for carrying large currents and will not stand the strain of larger conductors. In steel-tower lines the towers can be much further apart than the poles in wood-pole lines. Thus it will be seen that

the greater strength of the one with its heavier cost of erection counter-balances the inferior strength of the other with its relative cheapness of erection. Failure of supply on overhead lines can be brought about by many causes; lightning striking the lines is very dangerous, but this has been eliminated by the use of choke coils at the line ends; birds settling on the lines and short-circuiting the conductors or earthing them is a common cause of failure; trees falling on the line; very high winds; and snow and ice in winter are all troubles which the overhead-line engineer has to consider when erecting such lines. Telegraph wires, roads, railways and canals all have to be guarded when they are crossed by lines, and the proper clearances must be given by the engineer.

Electric Supply. During recent years the question of universal and adequate provision of electric current has become very important: the wheels of industry turn largely by means of electricity, whether it be supplied by private installations or from central power stations. Electricity may be provided in direct current (d.c.) or alternating current (a.c.) but the latter has become generally used owing to the much greater facility with which it can be distributed.

Generators.—Electrical energy, whether it be direct or alternating current, is generated by revolving or passing a conductor through a magnetic field. In a dynamo or d.c. generator the field is always stationary and the energy is collected from brushgear, whereas an alternating current generator or, as it is usually called, an alternator, has the field revolving (rotor) and the energy, in this case, is induced into the stationary winding or (stator). When a conductor is passed through a magnetic field the potential can be measured by fixing the two ends of the conductor to slip rings on the revolving shaft. It will then be found that the current varies in pressure from maximum to zero according to the speed of the conductor. This is called a.c. To convert this to d.c. the conductor is tapped and connections made to copper segments, also on the revolving shaft, termed a commutator. The conductor in this instance is wound in the form of a coil and tapped at an equal number of turns to each segment. This rectifies the bottom part of the alternating wave form, thereby causing current to flow in one direction only, hence d.c. In large a.c. generators the great advantage with the revolving field is that low voltages and small currents need only be used to excite very large machines and that the stator, being stationary, can be more easily insulated to stand up to 22,000 volts. The excitation current is carried to the revolving rotor through slip rings on the main shaft. This current is supplied by a self excited d.c. generator also fitted on the main shaft of the turbine. But, as has been said, the practice of generating d.c. is rapidly dying out as the transmission of a.c. is more flexible and adaptable and more easily applied to works

and factories in general. For fuller details, see ELECTRIC GENERATOR.

Direct Current.—Private installations for the supply of lighting, and power in isolated premises are generally adequately provided for by a single d.c. machine (dynamo). This is driven by a gas, oil, or petrol engine as the motive power. The dynamo is employed to charge a storage battery during the day, the battery itself then being used for the various purposes required. It is, however, found to be more economical to use more than one dynamo, several small ones being less wasteful than one large one. One method, the one most generally used, will suffice to show the way in which they are connected up. The dynamos are connected

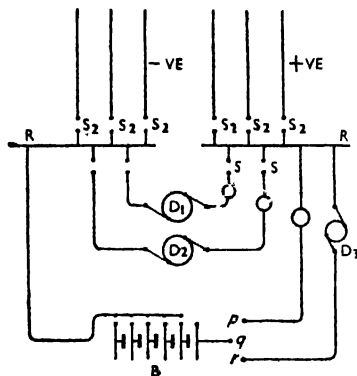


FIG. 1

together in parallel on to two bars called omnibus bars. Fig. 1 shows roughly this method. It represents the bars to which the two dynamos are connected in parallel. In the circuit are the switches S , by which any dynamo can be put into or taken out of the system. To these bars are also connected the outside distribution cables, also containing the switches S . The regulating battery B is charged by the booster D_3 by joining qr , and may be discharged by joining pq , its action being that of a regulator, as previously explained. As the cells composing the battery are slowly discharged, their E.M.F. gradually decreases, and it is necessary to correct this by placing more cells of the battery into action by means of switches.

The above method is practicable only for small power stations, whose area of distribution is limited and where the current used is not large, and so has practically the same value in all parts of the circuit. This, however, is impracticable in very large areas. In this case the distribution takes place through underground cables, and questions of economy demand that the cost of these should be a minimum. Electric power is the quantity in which the amount of electricity

utilised is measured by the product of the voltage and current. Now, the higher the voltage employed the smaller may be the cross section of the cable, and thus, by using high pressure and a low current, the amount of copper utilised may be smaller. There is a limit to the extent of this pressure, as the lamps manufactured cannot use a pressure higher than about 250 volts. As the current passes along the wires there is a loss of pressure due to the resistance, and when power is utilised from the cables to light lamps, etc., at varying distances from the supply, it is clear that the voltage along the wires must decrease as we go further away. In order to keep all the lamps at the same brightness the voltage should be the same at all parts of the circuit. This ideal condition is impossible, but it may be approximated to by making

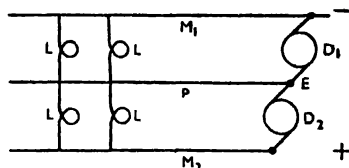


FIG. 2

the cables very thick to minimise resistance. It has been pointed out that the only way to save expense on the cables is to make the pressure as high as possible. This difficulty of electric lamps limiting the extent of this pressure led to the introduction of the *three wire system*, which doubles the pressure on the mains, while the pressure on the lamps remains unchanged. In Fig. 2 let M_1 and M_2 represent the mains in the diagram, let P be the middle wire, and let the mains be joined: M_1 to the negative terminal of the dynamo D_1 , and M_2 to the positive terminal of the dynamo D_2 , and the positive terminal of D_1 be joined to the negative terminal of D_2 . Let the lamps L be joined two by two in series 'cross the mains. Now, when there is the same number of lamps between M_1 and P and P and M_2 , there is a constant potential along P , and thus no current tends to flow along it; but on removing a lamp from between M_1 and P (say), this equilibrium is disturbed; this results in increasing the resistance between M_1 and P , and thus there is a greater fall of pressure than between P and M_2 , which lowers the potential at the point on P where the lamp has been taken out. The potential at the point E is clearly constant, and thus a current flows along P ; thus it may be deduced that the current that P carries is only due to the increase of the number of lamps over that on the other side of it. This by proper adjustment may be made very small, and thus the wire P may be made much smaller

than the mains M_1 and M_2 . This explains in brief the action of the system. Now, suppose each dynamo capable of maintaining a potential difference at its terminals of 100 volts: clearly when they are joined in series, as in the diagram, the potential difference between the mains M_1 and M_2 will be 200 volts, and also the pressure on the lamps will be only 100 volts, thus showing that, while the pressure in the mains is doubled, the pressure on the lamps is unaltered.

The immense advantages which accrued from the use of the three-wire system have largely displaced the system for private installations explained earlier. The dynamos are connected to omnibus bars as in the previous case, as also is the external circuit. The middle wire is connected (see Fig. 3) to the middle bar M , the excess of current being supplied to it by the two balancing dynamos D' , one placed on each side. As the prime motive power, various engines have been utilized, of which the turbine is the most economical. (See ELECTRIC POWER GENERATION.)

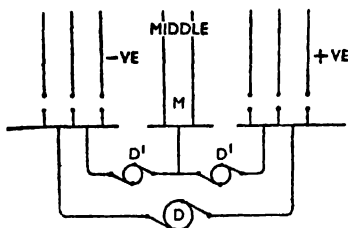


FIG. 3

The previous discussion has mainly dealt with the problem of lighting. The principles underlying the supply for traction purposes are very similar. Here there is the advantage that the time of running is known, and further variations of pressure are not so important as with lighting. Compound dynamos are used so as to give an increased pressure with an increased load. This is an important factor, since the variation occasionally is very sudden. The supplies for lighting and traction are always separate, owing to the great variations of the traction supply. They are connected up to separate switchboards which have no connection with each other. Economic considerations determine the site of the supply station, which in large towns, usually lies outside the boundaries. To supply an ordinary voltage of about 500 volts, the feeders would be very long, as well as the mains. It is therefore necessary still further to increase the pressure. This will be higher than can be utilised by lamps, consequently 'sub-stations' are introduced which receive the high pressure current from the central station and reduce its pressure.

Alternating Current.—The prime movers in these stations are similar to those of the d.c. stations. The alternators are, as

with d.c. machines, connected up in parallel. These are represented in Fig. 4 by A , connected to the omnibus bars B . The current clearly depends upon the number of alternators working, and thus,

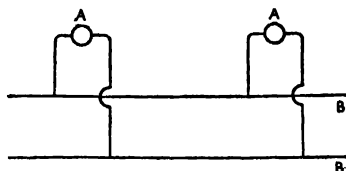


FIG. 4

owing to the varying demand on the current, arrangements are made whereby any number of alternators may be put into or taken out of the system. The difficulty arises when an alternator is synchronised into the circuit. It is necessary to switch the machine into the circuit at the exact moment when it is in step with the other machines, so that when the switch is closed no undue voltage rise takes place. When synchronised, the machine is then ready to pick up load to ease the other plant already working. So long as the speed of the turbine remains constant, the frequency of the current generated is constant. The standard frequency for all electricity supply stations throughout this country is 50 cycles per sec. This means that the current and voltage oscillate or alternate at this high speed. It is this frequency which is responsible for maintaining a constant speed on all a.c. motors and apparatus even to maintaining Greenwich time on electric clocks, which are simple synchronous motors running in step with the main power

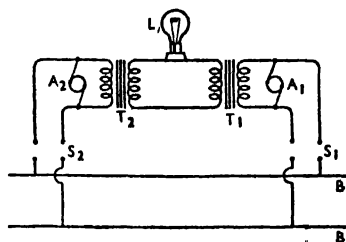


FIG. 5

station alternators. The instrument used to synchronise or parallel the alternators together is called a 'synchroscope.' A simple diagram illustrating the principle of this instrument is shown in Fig. 5. The alternators A_1 and A_2 can be connected to the omnibus bars B by the switches S_1 and S_2 respectively. Further, each alternator is connected to the secondary coils

of the transformers T_1 and T_2 , the primary coils of the transformers being connected in series with the lamp L ; then the current induced in these primaries may travel in the same direction, when the lamp will glow brightly, or in the opposite direction, when the light will be more feeble. Assume the alternator A_1 to be connected to the omnibus bars. At the instant of the maximum brightness the two alternators are obviously in the same phase, and thus at this instant the alternator A_2 may be placed in the circuit. Even if there is a slight difference of phase the action of the current in the circuit tends to eliminate this difference. All the alternators work at a very high pressure, averaging about 11,000 volts; hence the necessity for great care in manipulating the current.

Distribution.—In most large tns. the system of distribution is as follows: The mains from the generating station are high-voltage a.c., three phase; these

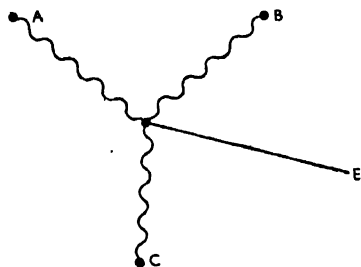


FIG. 6

mains are run to sub-stations situated at the best distributing points in the tn. In the sub-station is a transformer or transformers with their high-tension switch-gear, and on the low-tension side there are other fuses and switch-gear. The supply to houses is single-phase a.c. with one side earthed to neutral point on the transformer. This system is taken into the houses, and is then split up into two circuits, one for cooking and heating, and the other for lighting. The most modern practice is to transmit throughout the country on the 'electric grid' system (see below) at 132,000 volts and distribute at numerous sub-stations. This extra high voltage is then stepped down, through static transformers, to declared voltages for lighting and power. For lighting it is approximately 230 volts single phase. For power it is usually 415 volts three phase but for very large motors 11,000 volts have been used on the windings with advantage. The object of using the three phases for power is to avoid the overloading of single phase circuits. This is similar to the explanation given earlier upon the three-wire system except that four wires are usually used in a.c. circuits. In Fig. 6, A, B, and C represent the three phases, E the fourth wire

which is always at earth potential. Then from either phase to E or earth the potential is usually about 230 volts whereas between phases say A to B, or A to C, or B to C, they are all at 415 volts for power circuits. In country districts, where the amount of electricity used is small and the houses are relatively far apart, the laying of underground mains is too expensive to be practicable; thus the vills., farms, and rural industries are supplied by overhead transmission, and the distribution is carried in the same way as in tns., except that the houses are served from transmission lines carried on wood poles running down the roads from which each house taps its own power. In U.S.A. and Europe the system of supply by overhead lines is fast becoming universal, since by this method electricity can be transmitted from hydro-electric power (q.v.) stations situated in mts. to cities and tns. at a minimum of cost. See also ELECTRIC POWER TRANSMISSION.

'Electric Grid.' This is a national system of running a large number of power stations all over the country under one central control-authority. To maintain a power station under constant full load over 24 hours working is the highest form of efficiency and is the aim of every electricity undertaking. The country is therefore split up into zones or areas and all power stations in that area are pooled under one control. All stations are then worked on the main network called 'The Grid' and can assist in taking the load when and where required. As the load falls at the end of the day so 'control' instructs the less efficient stations to come off the 'Grid' and shut down. This leaves the large and superstations all over the country to carry the greater part of the load at full capacity. This makes for efficiency and permits the running costs to be kept as low as possible, thereby helping to cheapen the cost of electrical units generated to the advantage of the country in general and to the consumer in particular. See bibliography for ELECTRIC GENERATOR; and Political and Economic Planning, *Report on the Supply of Electricity in Great Britain*, 1936; A. T. Starr, *Generation, Transmission, and Utilization of Electrical Power*, 1941; H. Cotton, *The Transmission and Distribution of Electrical Energy*, 1945; E. W. Golding, *The Electrification of Agriculture and Rural Districts*, 1945.

Electric Traction. see under ELECTRICITY. There are three different systems of electric traction in use. They are: (i.) Direct-current (d.c.) systems; (ii.) single-phase systems; (iii.) three-phase systems. In the d.c. systems the voltages used vary from 600 to as much as 3000 volts. In the low-voltage system each motor is designed to take the full voltage of the trolley rail to earth. In most other systems the motors are designed to take half the voltage, motors being arranged in series of pairs. In the single-phase systems the third rail is not used, owing to the high voltages employed; the voltages of the overhead wires range from 3000 to 10,000 volts and

over, and low frequencies of the order of 15 to 33½ cycles per sec. are used. The motors are not run directly from the supply voltage, and it has therefore to be stepped down to 200 to 600 volts, which is the terminal voltage of the motors.

Application to Tramways and Railways.—The three-phase traction system requires the use of two overhead wires for each track, the track itself forming the necessary third conductor for the distribution, and the frequency varies from 16½ to 45 cycles per sec. The voltage ranges from 750 to 15,000 volts; transformers are carried on the trains to step down the voltage to 400 to 600 volts at the motor terminals. There are both advantages and disadvantages in each system, each of which must be considered. The cost of maintenance of a 600 volt d.c. system is low, and the motors used cost less, weigh less, and occupy less space than those of a high voltage d.c. system; on the other hand, a low voltage d.c. system requires the use of frequent sub-stations to convert the power available to the line voltage; also these converters are rotary, while in the case of alternating current (a.c.) systems the sub-stations are static in that they contain only transformers and the necessary switchgear. Rotary converter sub-stations also cost more to instal and maintain than transformer sub-stations. With a.c. systems transformers are required on the locomotives, thereby adding greatly to the cost and weight of the train equipment. Low voltage d.c. systems are used chiefly on interurban traffic, whilst the high voltage d.c. and a.c. systems are used on long distance trains. In Italy and Switzerland, owing to the lack of coal and the abundance of water power, the electric locomotive is all-powerful. In N. Italy there are sev. three-phase systems of which the most notable is the Genoa-Milan railway, which employs 3000 volt three-phase current, all of which is obtained from hydro-electric power stations.

Trolleybuses require two overhead lines, one for the supply and one for the return current, and consequently two trolleys. The wires are usually 4/0 S.W.G. hard-drawn copper. Ministry of Transport regulations stipulate that the supply line shall be completely insulated, the return line earthed at the station but otherwise insulated. Other paragraphs of the Regulations specify the maximum permissible leakage current (0.01 A. per m.), sectionalising of lines (0.5 m. max.) and routine insulation testing. The supply is protected by circuit-breakers and over-current relay. The vehicle has usually one motor only, though some designs use two, mounted forward or in the middle of the chassis. Forward mounting gives easy access to the motor for inspection, better cooling and less dust, but requires a longer cardan shaft for the rear-wheel drive. The motor power varies between 50 and 80 h.p. according to seating capacity (35–66) and wheel base (4 or 6 wheels). The motor is d.c. series-wound or, if regenerative braking is used, compound-wound. Some types use a series

motor with double armature for series-parallel working. The voltage preferred in Great Britain is 500 V. In the case of regenerative braking, when the motor acts as generator during coasting, a resistance is automatically put into the lighting circuit to protect the lamps against excessive voltage. The controller is foot-operated and may be of contactor or drum type, and the power pedal is interlocked with the reversing switch. A hand brake is always fitted and where regenerative braking is not used, rheostatic or vacuum brakes are supplied. The trolleybus must be turned at the terminals, and where no loop circuit through adjoining streets can be provided, a turning circle must be made in the road. Some buses are provided with an accumulator battery for manoeuvring independently of the overhead for short stretches. A trolleybus was first used experimentally in the U.S.A. in 1892 and during 1900–1912 various lines were operated both on the Continent and in England (Kelghley, Bradford, Leeds). But the modern large-scale development in design and application dates from 1926, when the first six-wheel double-deck buses with pneumatic tyres, built by Guy Motors Ltd., were put into operation in Wolverhampton. This system has remained the model of passenger transport service and was soon followed by replacements of tramcars by trolleybuses and installation of new routes, in Great Britain, on the Continent, and overseas, earning for England the name of 'the Home of the Trolleybus.' Of all heavy vehicles, the trolleybus is the least noisy. Unlike the tramcar, it loads and unloads its passengers at the kerb and is not confined to a track, but can give way to other traffic. Unlike the petrol bus, it emits no fumes, its maintenance costs are low, since the smooth acceleration of the electric motor causes less wear than the jerky gear-changing, and the fire risk is low. Moreover, it constitutes a valuable load balancer on the electric power station. (See Brit. Standard Specification 173.)

See also RAILWAYS; TRAMWAYS. See A. T. Dover, *Electric Traction: a Treatise on the Application of Electric Power to Tramways and Railways*, 1929.

Electric Units, see AMPERE, BOARD OF TRADE UNIT, COULOMB, DYNE, ERG, FARAD, JOULE, MHO, VOLT, WATT.

Electric Waves. When a current in a circuit is a low-frequency alternating current, it radiates waves of energy from it when the current is at a maximum; and these waves return when the current is zero. But when the frequency is high, part of the energy is sent out into space, and never returns. This energy is said to be radiated; and in radio circuits, where the frequency ranges from 15,000 to 20,000,000, this loss forms the main loss of the circuit. The radiated wave is an electro-magnetic wave, and travels with the velocity of light (186,000 m. per second). These waves are propagated in all directions over the earth's surface, and the length of the wave is found by dividing the speed of the wave in metres per sec.

(300,000,000 m. sec.) by the frequency in cycles per sec., the result being the wavelength in metres. As the wave travels outwards from the transmitter the wave tends to increase its height. If the earth is a good conductor, the wave remains upright; if, however, it is a bad conductor, the wave tilts forward in the direction of motion, and the crest of the wave overhangs the base, and if the air is ionised and thus acts as a brake on the wave, the wave tips backwards. Radio waves can be reflected and refracted in the same way as light. A mass of metal will deflect a wave out of its path; a mt. which is highly metalliferous will absorb the wave, and a receiving station in the lee of it will receive no signals. Waves, however, will pass through water, and submarines at the bottom of the ocean can receive messages; also they will pass through land, and radio receivers taken down deep mines have been worked efficiently.

Electric Welding, *see under* METAL-BURGY.

Electric Wiring, *see* ELECTRIC LIGHTING AND WIRING OF HOUSES.

Electricity, Atmospheric, the occurrence of thunderstorms shows that the atmosphere is in a state of electrification, similar to that obtained in any laboratory experiment. This was shown by Franklin by the use of an ordinary kite. Later investigation has shown that the state is variable, it being positively electrified during fine weather and generally negatively electrified during wet weather. The most convenient electrical unit to employ in these investigations is that of potential (*see* ELECTRICITY). The principal methods that have been employed are the determination of the potential of the earth's surface at a specified place and time, or to measure the difference of potential between a point in the air and the nearest point on the earth's surface. This is measured by placing a burning match at the end of a long insulated conducting rod placed vertically. While there is a difference of potential between the air and the rod, the products of combustion carry off the induced electricity until this difference of potential is destroyed. A quadrant electro-meter is attached to the bottom of the conductor, the readings on which will give the difference of potential between the air near the flame and the earth. Another instrument, the principles underlying which are similar to the above, which can also be used for the above determination, is the Kelvin water dropper. The result of these experiments shows that the difference of potential increases with the height. As a result of these experiments, Sir W. Thomson found that the difference of potential for a point 9 ft. from the ground varies between 200 and 400 volts. Various theories have been advanced in explanation of this phenomenon, all of which are very unsatisfactory. Explanation has been sought in assuming that particles of water when leaving the surface of water in lakes, etc., due to evaporation, assume a charge opposite to that of the water which they

leave. Condensation of vapour has also been held responsible. Further theory has explained the phenomenon as a result of friction between dry air and moist air, or air passing over the earth's surface. The more frequent occurrence of thunder storms in calm than in windy weather is sufficient refutation of this theory. Thus we see that no adequate explanation of the phenomenon has yet been obtained.

The most usual form of lightning is a discharge from a cloud. This occurs when the cloud is at positive potential, and the lightning consists of clearly defined branches directed away from the cloud towards the earth. Sometimes the positive charge is on the ground, and the lightning flashes from the ground to the cloud. There are also cases when the lightning discharge is from one cloud to another. In these cases the charge eventually is discharged to earth from the cloud which received it. One of the phenomena connected with storms is balls of fire which apparently accompany very brilliant flashes of lightning. These take up many varied shapes and sizes, varying from the size of a pea to a foot in diameter; they usually glow, and sometimes disappear quietly, and sometimes they explode with great force. These balls are always connected with lightning, and no satisfactory explanation of their substance and formation has yet been stated.

Owing to the very rapid growth of radio communication, the question of atmospheric electrical disturbances and their elimination is very important. Space is always agitated by electric disturbances, due to ionisation by the wind or the sun's rays, or by thunder storms, with their electric discharges. In tropical regions these 'atmospherics' or 'statics,' as they are called, become very prevalent, owing, no doubt, to the great heat of the sun. The disturbance itself is an impulse of electricity of exceedingly short duration, and in a radio receiver gives rise to an unpleasant crackling and hissing sound. In the case of receiving signals such as trans-Atlantic signals, which have to pass over large expanses of ocean, these static disturbances are very prevalent, sometimes making reception impossible; were it not for these statics, trans-oceanic communication could be carried out on ordinary wave-lengths and on a power of one kilowatt. The interference can be eliminated to a certain extent by the proper use of coil antennae and balanced earth antennae systems. Lightning used to be a very serious problem to the overhead transmission engineer, but this interference has been overcome by the use of choke coils in series with the line, and also by surge absorbers which are large condensers and, as their name implies, absorb the resultant surge in a line when it is struck by lightning.

Electricity and Magnetism. In the following article the science has been subdivided into its usual branches, and dealt with in the following order: (1) electrostatics; (2) magnetism; (3) current electricity; (4) electro-magnetic induction;

(5) electro-magnetic waves and Maxwell's theory of light; (6) electrolysis. A short account of its historical development is given at the commencement of each branch. This seems the most consistent and convenient method, since the development of any one branch has proceeded independently of that of the others.

(1) **ELECTROSTATICS.**—This part of the science deals with electricity in equilibrium. A Gk. philosopher, Thales, who lived about 600 B.C., discovered that amber, when rubbed, acquired the property of attracting light substances, such as pieces of pith or cork. Towards the end of the sixteenth century, Wm. Gilbert found that this property was also possessed by many other substances, such as sulphur and glass. All such phenomena are studied under the science of electricity, the name being derived from the Gk. word for amber. Gilbert's work was followed up by Robert Boyle, who added to the list of electrics. In 1729 Stephen Gray discovered the properties of insulators and conductors. If an electrified piece of sulphur is laid on another piece of sulphur it retains its electricity for some time. The same thing occurs if it is suspended by a piece of dry silk thread. If, however, it is rubbed gently with a damp cloth, or with the hand, or touched all over with a piece of metal foil, it loses its charge. The sulphur and dry silk thread are called insulators, whilst the hand, the damp cloth, and the metal foil are conductors. If a metal rod is held in the hand and rubbed with a dry cloth, no electrification apparently takes place, but if the metal rod has an ebonite handle by which it is held, the rod becomes electrified on rubbing. In the first case electricity is produced on the metal, but it is immediately conducted away by the hand. In the second case the ebonite handle, which is an insulator, prevents the electricity escaping. Whilst Gray was pursuing his researches in England, scientists on the Continent were busy making and perfecting electrical friction machines and condensers, and about this time the Leyden jar made its appearance. It was during this period also that Charles Dufay discovered that there were two kinds of electrification. This can be estab. as follows: A wire stirrup is suspended by means of a dry silk thread. In the stirrup a rod of glass or ebonite can be suspended after it has been electrified. Electrify one end of an ebonite rod by rubbing it with a piece of dry flannel, and suspend it in the stirrup so that it hangs in a horizontal position. Now electrify another rod of ebonite by rubbing it with flannel and bring it near the electrified end of the suspended rod. The latter is repelled. Now electrify a piece of glass by rubbing it with dry silk, and bring it near the suspended ebonite. The latter is attracted. This shows that there are two different kinds of electrification produced on the ebonite and glass. Dufay called the electricity produced on the ebonite 'resinous' or negative (—), and that produced on the glass 'vitreous' or positive (+). If the flannel and silk are

very dry, it is found that, after rubbing the former attracts the suspended ebonite rod whilst the latter repels it. This shows that when a piece of ebonite is rubbed with flannel the ebonite becomes negatively electrified whilst the flannel becomes positively electrified. In the case of glass and silk, the glass becomes positively electrified and the silk negatively electrified. These experiments led to the proposition of the two-fluid theory. All unelectrified bodies were supposed to contain vast equal quantities of vitreous and resinous fluids. When a body was electrified, it was supposed to gain an additional quantity of one fluid, and lose an equal quantity of the other, so that the total amount of fluid does not alter. In later years Benjamin Franklin (1706–90) maintained the existence of one fluid only, which unelectrified bodies possess in a certain normal amount. A positively charged body has more, a negatively charged body less, than this normal amount. Franklin also did much work with the Leyden jar, and succeeded in showing that the seat of the charge is the dielectric (see CONDENSERS). On this foundation Michael Faraday (1791–1867) and James Clerk-Maxwell (1831–79) have built up the whole theory of electrical science. John Canton (1718–72) was the first to discover the phenomenon of electric induction. Charles A. de Coulomb (1736–1806) and Henry Cavendish (1731–1810) investigated independently the law of electric attraction and repulsion, and Faraday, at the beginning of the nineteenth century, showed that electricity was a measurable quantity.

Electric induction.—Suppose C is an insulated conductor and is positively charged (Fig. 1). Suppose AB is an insulated, unelectrified conducting cylinder

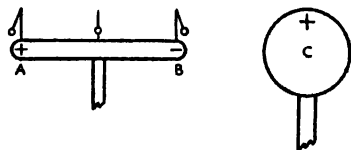


FIG. 1

on which three pith balls are suspended, as shown in the diagram. When C is far from AB the pith balls all hang vertically. When C is brought near to one end of AB (say the end B), the end B becomes charged with electricity of the opposite sign to that of C, whilst the end A is charged with electricity of the same sign as C. There is no charge on the middle parts of AB. This is shown by the fact that whilst the pith balls on the ends are deflected from their stands and away from AB, the middle ball is undeflected. If AB is touched with the finger or otherwise connected to earth, whilst still under C's influence, it loses its charge at the end A. If C is now removed, the body AB becomes uniformly charged with

electricity of the opposite kind to that of C. AB is then said to be electrified by induction or influence. It is obvious that these phenomena can be explained from the fact that like charges repel, and unlike charges attract each other. The un-electrified cylinder is considered to have an equal quantity of positive and negative electricity. It will be seen that a more vigorous explanation is possible from considerations of electric potential. Electric induction gives us the best means of obtaining a continuous series of charges and all friction machines are based on this principle.

The *electrophorus* is the simplest of influence machines. This consists of a disc of resin, or some other material easily excited, A (Fig. 2), and a polished metal plate, B, with an insulating handle, CD. The metal plate should be a little less in size than the resin disc. The latter is

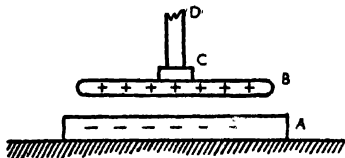


FIG. 2

electrified by striking it with dry flannel or fur. The metal plate is then placed upon it. The plate will not touch the disc except at a few points. Thus between most of the surface of the plate and that of the disc there will be a thin film of air. Thus B will be electrified by induction, that is, positive electricity will appear on the face of B near to A, and negative electricity on the face farther away. If the metal plate is now touched with the finger, the negative charge will be conducted away. Thus on removing the plate it will be found to have a positive charge. B can be charged by this method many times without appreciably altering the charge on A. A is often fitted into a shallow metal vessel, called the sole, which increases the utility of the arrangement.

Variation of electric force with distance.—It was shown by Franz *Äpinus* (1724–1802) that the electric force between two charged bodies diminishes as the distance increases. Coulomb, who made experiments with a torsion balance of his own invention, was the first to publish proof that the force varied inversely as the square of the distance between the electrified bodies. Coulomb experimented first on the couple required to produce a twist in a wire, and found that for a given twist the couple varied as the fourth power of the diameter of the wire. Coulomb's balance consists of a small gilded pith ball, A (Fig. 3), placed at one extremity of an arm, ABC, of shellac. This arm is suspended by a very fine silver wire, so that it hangs in a horizontal position.

At the top of the silver wire is a graduated screw, so that the wire can be subjected to a known twist. A second ball, E, is suspended by an insulating rod, so that it just touches A. The whole apparatus is placed within a cylindrical glass case. The ball A is then charged, and E brought

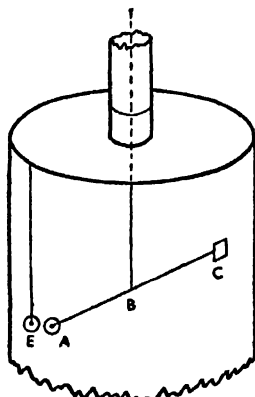


FIG. 3

up to it. When they touch, the charge is shared between them and they repel each other. E is fixed, so the rod ABO is twisted through an angle. The wire is now given a known twist. The rod ABC takes up another position, making a different angle with its original position. Knowing these two angles, the distance between the balls can be ascertained and the force between them is known from the twist given to the wire thus: Suppose that α is the angle ABO (Fig. 4) first turns through. Then suppose a twist, γ , is given to the wire, and let the angle of ABC with its original position be now β .

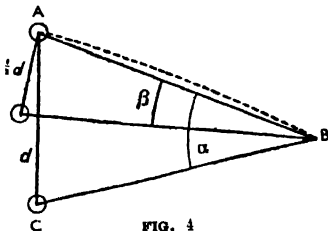


FIG. 4

The total twist in the wire is now $(\beta + \gamma)$. The original twist was α . Suppose now γ be made such that the distance, d , between the balls is halved, it will be found that $(\beta + \gamma)$ is four times α ; if the distance d is reduced to $\frac{1}{2}d$, $(\beta + \gamma)$ will be nine times α , and so on. Since the

force between the balls varies as the twist in the wire, it must vary inversely as the square of the distance between them. Coulomb was thus able to prove that this law was approximately if not absolutely true. Cavendish employed another method of proving the law of inverse square. It can be shown mathematically that if the law of inverse squares does hold, then there is no force inside a uniformly charged sphere. If the power is anything except the inverse square then there is force within the sphere. Now, whenever an electric force acts on a conductor, we have electric separation of induction, and parts of the conductor become electrified differently from other parts. If then we find that within a charged conductor no separation of electricity occurs, it shows that no electric force exists. Cavendish took a conducting globe and supported it on an insulating stand. He then enclosed the globe in two hemispherical conducting shells, which fitted exactly together to form a spherical shell without anywhere touching the globe. He then made connection between the globe and the shell by means of a wire pushed through a hole in the shell, and charged the shell, afterwards removing the wires by means of a silk thread in such a way that the shell was not discharged. He then removed the hemispherical shells and tested the inner globe for a charge. For this test, he used two pith balls which were suspended side by side. He found that the globe was uncharged, and so proved that there was no force inside a charged sphere, and also that the charge of a conductor resides on the surface. Thus he deduced that the law of inverse squares held.

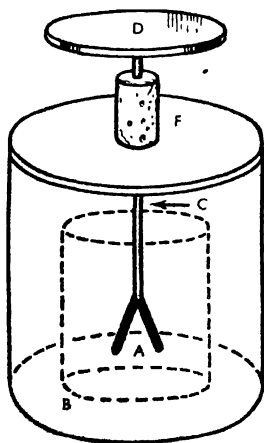


FIG. 5

Gold leaf electroscope.—Cavendish, in his experiment, used a pair of pith balls as his electroscope. This is not very

sensitive. A very sensitive instrument has been devised by Bennet. It consists of two gold or aluminium leaves, A (Fig. 5), suspended from a brass rod, C. This rod terminates in a disc, D, after having passed through an insulating plug, F. Thus A, C, and D form one conductor, which is well insulated. The leaves, A, are surrounded by a cylinder of wire gauze, B. In some instruments this is replaced by strips of foil placed on the glass vessel surrounding the leaves. When the leaves are electrified, they repel each other to an angle which roughly indicates the intensity of their electrification.

Electricity as a measurable quantity.—Most of the preceding experiments have been qualitative. But we can speak of giving a conductor a definite amount of electricity just as we can speak of pouring a definite amount of water into a vessel. The following ice-pail experiments, due to Faraday, justify the use of the term 'quantity of electricity.' Faraday placed

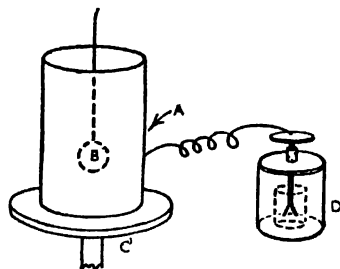


FIG. 6

a pewter ice-pail, A (Fig. 6), on an insulating stand, C, and connected the outside to a gold-leaf electroscope, D. A charged metal ball, B, was then lowered into the pail by means of a silk thread. As it approached, the leaves of the electroscope gradually diverged. The divergence attained a maximum when B was well inside the pail. On moving B about inside the pail, it was found that the divergence of the leaves did not alter. Another uncharged ball was lowered into the pail and allowed to share the charge on B. Still the deflection was unaltered. Finally, the balls were allowed to touch the inside of the pail. The deflection of the leaves did not change. On drawing the balls out again they were found to be uncharged. It is thus concluded that the divergence of the leaves depends on something which remains constant however the ball is moved about inside A. This something we shall call a quantity of electricity, and this quantity remains constant, not depending on the position, nature or size of the charged body. Having accepted the idea of quantity of electricity, we can show that the induced charge in the inside of the vessel is equal and opposite to the inducing charge, because when the ball

touched the inside of the vessel the quantity on the outside did not change. Again, the charge on the inside of the vessel must be equal and opposite to that on the outside, since, if the ball were taken out before touching the inside, the pail would be uncharged.

Unit of quantity.—The electrostatic unit of quantity of electricity is defined as that quantity which, when placed on a small particle at unit distance from a similarly charged particle, repels it with force, the particles supposed to be separated by air. It can be proved by means of the torsion balance that the force between two charges e_1, e_2 , is proportional to their product. Thus if f be the force and r the distance between the charges e_1, e_2 , $f = \frac{e_1 e_2}{K r^2}$ (where K is the specific inductive capacity which has unit value for air). See CONDENSERS.

Electric intensity.—The electric intensity at a point in an electric field is the mechanical force which would be exerted on a small particle charged with unit positive quantity of electricity and placed at the point. The electric intensity must not be confused with the mechanical force between two charged bodies.

Electric potential.—This can be defined as that which measures the condition of the body on which its power of communicating electricity to, or receiving electricity from, other bodies depends.

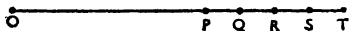


FIG. 7

From this definition it is at once seen that electric potential is analogous to temp., and to pressure in hydrodynamics. The difference of potential between two points can be defined as the work done against the electric forces in bringing one positive unit of electricity from one point to another, the state of the field supposed to be unaltered by the transference. The potential of any point in space can be defined as the work which must be done in bringing up to the point from an infinite distance a particle charged with unit positive quantity of electricity. Consider the potential at a point P, at a distance r from a charge e at O (Fig. 7). Suppose the charge is positive, and concentrated at a point—O. Join OP and produce to a great distance. Let Q, R, S be points on OP, distant r_1, r_2 , etc., from O. The force at P is $\frac{e}{r^2}$, at Q it is $\frac{e}{r_1^2}$, at R

it is $\frac{e}{r_2^2}$, and so on. Suppose Q, R, S are close together, so that r_1^2 is almost the same as r_2^2 , and both can be put as equal to $r_1 r_2$, and so on. Let v_1, v_2 , etc., be potentials at Q, R, S, etc. Then $v_1 - v_2 = \frac{e(r_2 - r_1)}{r_1 r_2}$, because the work done from R to Q on unit positive charge is equal to the difference of potential and

also to the product of the force and distance. Also $v_2 - v_1 = \frac{e(r_1 - r_2)}{r_1 r_2} \therefore v_1 - v_2$

$= \frac{e}{r_1} - \frac{e}{r_2}$, $v_2 - v_1 = \frac{e}{r_2} - \frac{e}{r_1}$, and so on, adding all such terms together to a point distant r_n from O, we get $v_1 - v_n = \frac{e}{r_1} - \frac{e}{r_n}$. Let Q coincide with P, and let r_n be infinite. Then v_n will be zero and $\frac{e}{r_n}$ will be zero. Therefore the potential

at P is $V = \frac{e}{r}$. Application of the principle of potential gives a concise explanation of many electrostatic phenomena. Take for example electric induction. It was seen that in bringing up a conductor, AB, of cylindrical shape to a positively charged body, C (Fig. 1), the end of the cylinder nearest the charged body became negatively electrified and the other end positively electrified. Now the charged body, C, sets up an electric field, the potential in which diminishes as the distance from A increases. When AB is brought into this field, the end B near C is at a higher potential than A. Thus since AB is a conductor, electricity will flow from the end B to A until the potential is uniform. Thus B becomes negatively electrified and A becomes positively electrified.

It has been shown that the charge resides on the surface of a conductor. The surface density of the charge at any point is that amount of electricity which would cover unit area surrounding that point if the electrification over this area were uniform, and equal to that at the point.

Capacity of a conductor.—It is found that the charge of an isolated conductor is proportional to the potential, i.e. that there is a constant ratio between them. This ratio is termed the electric capacity of the conductor, or it is the quantity of electricity required to raise the potential of the conductor by unity.

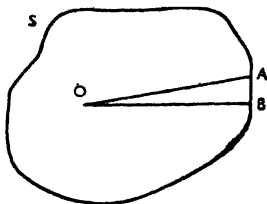


FIG. 8

Gauss' theorem.—Suppose we have an imaginary surface, S, surrounding a charge e , at O (Fig. 8). Consider a small element of area, a , at AB (say). Let N be the electric intensity normal to AB. Then the sum of all the products $N a$ (or $\sum N a$, as it is written) is equal to $\frac{e}{\epsilon}$. If AB is small, the intensity N over it can be

taken as uniform and acts along BO, and is equal to $\frac{e}{OB^2}$. With centre O and radius OB draw a sphere cutting OA in R. The intensity normal to AB is then $\frac{e}{OB^2} \times \cos RBA$. The product of the area and this intensity is (area $AB \times \frac{e}{OB^2} \times \cos RBA$). This is equal to (area $BR \times \frac{e}{OB^2}$), since area BR is equal to (area $AB \times \cos RBA$). With centre O describe any sphere cutting OA in P and OB in Q (Fig. 9). Then area PQ : area $RB = OQ^2 : OB^2$. Therefore area $BR \times \frac{e}{OB^2} =$ area $PQ \times \frac{e}{OP^2}$. This holds for all such elements, AB. Thus ΣaN is the

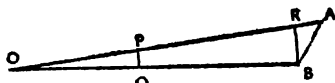


FIG. 9

same for the sphere as for the imaginary area S. But for the sphere N is constant and equal to $\frac{e}{OA^2}$ and Σa is equal to $4\pi OA^2$. Therefore for any surface S surrounding O the product ΣaN is equal to $4\pi e$. The proof can be extended to any number of charges. It can similarly be proved that ΣaN for surfaces not surrounding the charge is zero.

Intensity at a point, P, outside a charged sphere.—Through P draw a sphere radius OP (Fig. 10). The intensity normal to this sphere is everywhere the same and

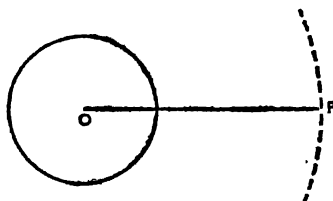


FIG. 10

equal to that at P (f say). Thus ΣaN is equal to $f \times 4\pi OP^2$, and this is equal to $4\pi e \therefore f = \frac{e}{OP^2}$. If σ is the surface density on the sphere, the charge e is $4\pi(OP)^2 \times \sigma$. The intensity at a point very near the sphere is then $\frac{e}{OP^2} = 4\pi\sigma$. This is Coulomb's law. Thus the sphere acts at external points as if its charge were concentrated at the centre. Therefore

the potential, at a point indefinitely near the sphere, and therefore that of the sphere itself, is $\frac{e}{r}$ (r is the radius).

Capacity of a sphere.—The capacity is the ratio $\frac{e}{V}$. Now $V = \frac{e}{r}$. Thus the capacity is r .

Energy of a system.—Suppose a sphere is initially uncharged and a charge, E , is brought up to it in very small amounts, e . Suppose at any time the potential of the sphere were V . The work done in bringing up a charge e would be eV . The potential would be raised to V_1 (say). The work in the next instalment would be eV_1 . Represented graphically we get a diagram as shown (Fig. 11). The total work done is the sum of all the vertical

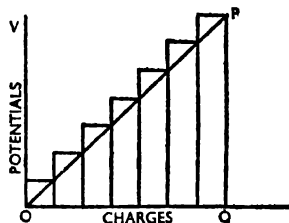


FIG. 11

strips. If e is made very small, the sum of these strips approximates to the area OPQ , i.e. it is $\frac{1}{2}EV$ (where E is the total charge and V the final potential). The energy of a sphere is therefore $\frac{1}{2}EV$.

Lines and tubes of force.—A line drawn such that its direction at any point is in the direction of the intensity at that point is called a line of force. If a tubular region of space be imagined as bounded

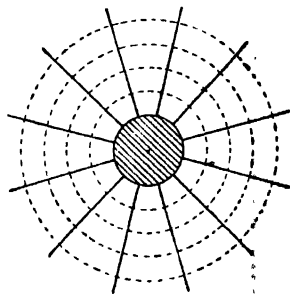


FIG. 12

by lines of force it may be called a tube of force or a Faraday tube. The importance of these tubes of force and the dielectric through which they pass will be

considered under electro-magnetic waves and Maxwell's theory. The lines of force from a positively charged sphere are shown (Fig. 12). The dotted lines are lines of equipotential. An equipotential line is one which passes through all points of the same potential.

Electrometers.—The attracted disk electrometer (Fig. 13) consists of a metal disk, S, which is supported by three fine springs, so that its surface lies slightly about that

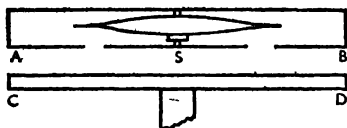


FIG. 13

of a guard ring, AB. The function of this ring is to keep the surface density on S constant, and thus avoid errors usually connected with edges of conductors. Another metal disk, CD, is placed on an insulating stand and parallel to S. It can be moved nearer to S by means of a micrometer screw. In using the instrument the guard ring and disk are connected to earth, and are thus at zero potential. The disk CD is connected to the conductor whose potential is required. The disk OD is moved until the disk S is in the plane of AB. The distance, d , between S and CD can be read off on the micrometer screw. The force, f , required to bring S into the plane of AB is determined, when OD is absent, by placing known weights on S. It can be proved that if V is the potential of CD, $V = \sqrt{\frac{8\pi d^2 f}{S}}$. Thus V can be determined.

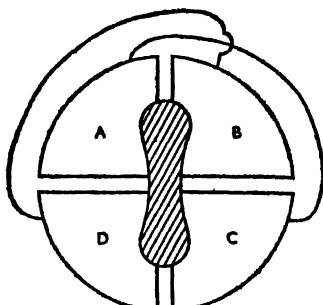


FIG. 14

Quadrant electrometer.—This electrometer was devised by Lord Kelvin and is extremely sensitive. In the simple form a light aluminium disk (called the needle) is supported in a horizontal position by a wire (Fig. 14). Any force tending to displace the needle is opposed by the torsion

in this wire. A shallow metal box divided into four quadrants, A, B, C, D, surrounds the needle. Each of the quadrants is supported on an insulating pillar. Opposite quadrants are connected together. When the needle is in equilibrium and the quadrants uncharged, it lies over the junction line between two quadrants. The needle is charged to a high potential. It still lies over the junction line as before. Any deflection of the needle is noted by the reflection of light from a small mirror attached to it, which reflects the light on to a scale. The position of the spot of light is observed when the needle is in equilibrium. If one pair of quadrants is put to earth and the other connected to the body whose potential is required, the deflection of the spot of light is proportional to the potential. If the opposite pairs of quadrants are connected to two sources of potential, V_1 and V_2 , and if V_1 is that of the needle, which must be great compared to V_1 and V_2 , the deflection of the needle is approximately proportional to $V_2(V_1 - V_2)$. Thus if the deflection is noted for a known difference of potential, a difference of potential producing any other deflection can be ascertained.

(2) **MAGNETISM.**—It was known to the ancients that certain black stones, iron ores, which were found at Magnesia in Asia Minor, possessed the power of attracting to themselves small pieces of iron. Such stones were called magnets. Several centuries later it was found that if a magnet were suspended freely by a thread, it always tended to set in one definite position. One end pointed N, the other S. Thus the magnet became known as the lodestone or 'leading-stone.' Practical use was made of this magnetic property in the formation of the compass needle. It was found that the needle does not point directly N. and S., but in a magnetic meridian, making an angle, called the declination (q.v.), with the geographical meridian. Burrows discovered that this angle changed during a voyage, and Halley in 1863 proved that the changes in declination at sea were not due to the effect of neighbouring land, but to the magnetic properties of the earth as a whole. In 1544 Hartmann discovered that a needle pivoted to move freely in a vertical plane dips down towards the N. when magnetised by a lodestone. Gilbert collected all magnetic phenomena then known into his book, *De Magnete* (1600), and also brought forward the conception of the earth as a huge magnet. Coulomb, with a modified torsion balance, investigated the mutual action of magnets, but it was left to Gauss to prove definitely that the law of inverse squares held for magnetic forces. In 1948 Prof. P. M. S. Blackett directed experiments in coal-mines to discover whether the magnetism of the earth increases or decreases at lower levels. The primary results showed a decrease in Great Britain and S. Africa.

Magnetic phenomena.—A small piece of watch-spring or steel can be magnetised in the laboratory in three ways: (1) Method of single touch; (2) method of double touch (3) electrical method.

Fig. 15a illustrates the method (1). The watch-spring is laid on the table, and one pole of a bar magnet drawn along the whole length of the spring. The process

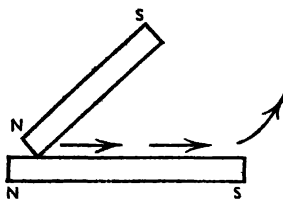


FIG. 15a

is repeated, always starting at the same end. The end at which the process starts has the same polarity as the pole used for magnetisation. Fig. 15b represents method (2). Opposite poles of two equally strong bar magnets are placed close together in contact with the middle of the

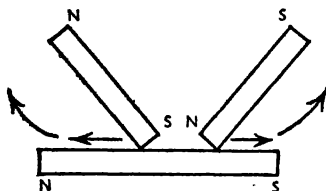


FIG. 15b

spring, and then drawn apart towards opposite ends of the spring. This is repeated several times. The electrical method is of great practical importance. If a wire is wound around a piece of soft iron and a current is passed through the wire, the soft iron becomes highly magnetised. In practice, the soft iron is in the shape of a large horse shoe. To produce a permanent bar magnet a piece of steel is placed across the ends of this large horse shoe and the current is passed through the wire for several short periods. The bar magnet is taken away at right angles to the surface where contact is made. A horse-shoe magnet is made in much the same way. The degree of magnetisation acquired by a piece of steel depends upon the strength of the magnet used in the process. But in every case there is a limit to the magnetisation produced. The steel is then said to be *saturated*. The magnetisation of a piece of steel may be destroyed by strongly heating, or by violent usage. A bar magnet when suspended tends to point N. and S. The end pointing N. is called the north seeking, or simply the north pole, and the other end is called the south seeking or south pole. The line joining

the poles is called the *magnetic axis*. It can easily be shown by two suspended magnets that like poles repel and unlike poles attract each other. Thus we have an analogy to electrostatics. A unit pole is defined as that pole which, placed at unit distance in air from a similar pole, repels it with unit force. The pole is positive or negative according as to whether it is north or south seeking. Unlike electrostatic effects, strong magnetic effects are observed only with iron and a few other materials, and also the force between two poles is practically independent of the medium between them, unless it be iron. Just as electric charges produce electric charges on conductors in their neighbourhood, so a magnetic pole produces magnetic poles on pieces of iron in its neighbourhood. Thus iron filings cling to a pole of a magnet because poles are induced on each filing, and opposite poles of neighbouring filings cling together, often producing long chains. A magnetic pole, or a whole magnet, is the centre of a field of force, the intensity at any point of which is defined as the force that would be exerted on unit positive pole placed at that point. This force is directive, and a line drawn such that the tangent to it at any point is in the direction of the magnetic force is called a line of magnetic force. The form of these can easily be

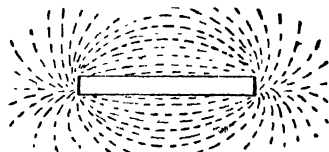


FIG. 16a

seen for a combination of magnets, by placing the combination under a sheet of glass and sprinkling filings on the glass. On tapping the glass the filings arrange themselves along the lines of force. Figs. 16a and 16b show the shape of these lines for a single bar magnet and two magnets respectively.

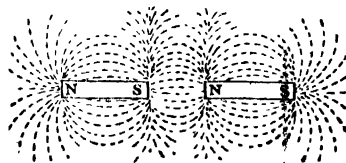


FIG. 16b

Variation of magnetic force with distance.—Gauss showed that the force due to a magnetic pole varied as the inverse square of the distance. Suppose a magnetic needle, AB, is placed at O, at which

point there is an intensity, F (Fig. 17), in an east and west direction. Let NS be the magnetic meridian at O , and H the horizontal component of the earth's field

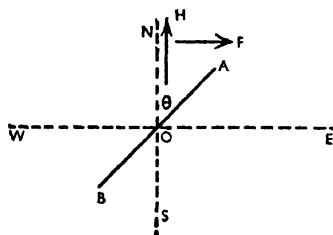


FIG. 17

at O . Let θ be the angle which AB makes with NS . If m is the strength of each pole, the horizontal force on it due to the earth is Hm , and if $2l$ be the distance between the poles, the couple due to the earth is $2mlH \sin \theta$. Similarly, the couple due to F is $2Fml \cos \theta$. Thus we get that $H \tan \theta = F$. $2ml$ is called the *moment*, M , of the magnet. Assume, for the time being, the law of inverse square. Let AB (Fig. 18) be a small magnet, of length $2l$ and pole strength m . Consider the

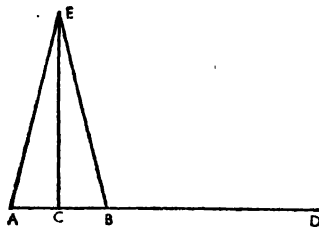


FIG. 18

intensity F , at a point D in AB produced at a distance r from C , the centre of AB .

$$F_1 = \frac{m}{(r-l)^2} - \frac{m}{(r+l)^2} = m \left[\frac{1}{(r-l)^2} - \frac{1}{(r+l)^2} \right]$$

Neglecting terms involving l^2 this becomes

$$F_1 = \frac{2M}{r^3} \quad (\text{where } M = 2ml, \text{ the magnetic moment of } AB).$$

Now consider the intensity at E a point on the normal to AB at C . The forces due to the poles act along AE and EB respectively. The resultant acts through E parallel to AB . The value of the intensity is

$$F_2 = \frac{2m}{(AE)^2} \cdot \frac{AO}{AE} = \frac{2m}{r^2 + l^2} \cdot \frac{1}{(r^2 + l^2)^{1/2}} = \frac{M}{r^3}$$

neglecting terms in $\frac{l^2}{r^3}$.

If we had assumed that the intensity varied inversely as the n th power of the distance, we should have had $F_1 = \frac{nM}{r^{n+1}}$ and

$F_2 = \frac{M}{r^{n+1}}$, i.e. $F_1 = nF_2$. On testing the intensities at D and E with a magnetised needle, it is found that $F_1 = 2F_2$, and therefore the law of inverse squares holds. This proof is due to Gauss.

Interaction of magnets.—It has just been shown that the intensity at a point, F (Fig. 19), due to a small magnet, AD , is $\frac{2M}{r^2}$ where $r = GF$. Suppose M' is the moment of a small magnet, CD , whose centre is at F . If CD is deflected through

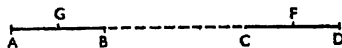


FIG. 19

an angle θ , the couple acting on it is obviously $C = \frac{2MM'}{r^3} \sin \theta$ (from the above

deflection of a needle in Fig. 17). The force which AB exerts on the pole m' at C is $\frac{2Mm'}{(r-l')^2}$. The force on the pole $(-m')$ at D is $-\frac{2Mm'}{(r+l')^2}$. Thus the total force of translation is

$$F = 2Mm' \left(\frac{1}{(r-l')^2} - \frac{1}{(r+l')^2} \right).$$

Neglecting squares and higher powers of l , this reduces to $F = \frac{6MM'}{r^3}$. Thus the couples vary inversely as the cube of r , whilst the forces of translation vary as the fourth power of r . By similar processes other positions of AB and CD may be investigated.

Magnetic potential.—The difference in magnetic potential between two points is defined as the quantity of work required to carry unit positive pole from one point to the other. The potential at a point is the work required to bring a unit pole up from infinity to that point. It can be shown just as in the case of an electric charge that the potential due to a pole m

$$\text{is } \frac{m}{r}.$$

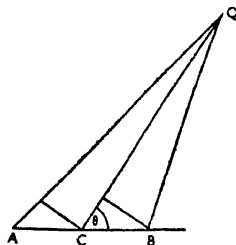


FIG. 20

Potential due to a magnet.—Let AB be the magnet with centre C (Fig. 20); Q

be the point distant r from C and $\angle QCB = \theta$. Thus the potential at Q due to m at A is $\frac{m}{AQ}$, that due to $-m$ at B is $-\frac{m}{BQ}$. Thus the potential, V , due to the whole magnet is

$$V = m \left(\frac{1}{AQ} - \frac{1}{BQ} \right) = m \left(\frac{1}{r + l \cos \theta} - \frac{1}{r - l \cos \theta} \right) = \frac{2ml \cos \theta}{r^2} = M \cos \theta.$$

Magnetic induction.—Magnetic substances like iron become magnetised under the influence of magnetic force. If a north pole were placed near a bar of iron, a south pole would be induced on the end of the bar nearer the pole. Attraction would take place, and the bar of iron would move into a stronger part of the field. If the bar were of bismuth, a north pole would be induced on the end nearer the pole and the bar would tend to move into the weaker parts of the field. Iron is said to be a *paramagnetic* substance and bismuth a *diamagnetic* substance. The magnetisation induced on the bar is measured by the resulting magnetic moment. The *intensity of magnetisation* is the magnetic moment per unit volume. Soft iron becomes more strongly magnetised than steel, i.e. it is more *susceptible* to

their axes in divers directions. When a magnetic force is applied, more and more of the molecules set so that their axes point in the same direction. Contiguous poles of the magnets neutralise each other except at the ends. Thus we have magnetic poles at the ends, and obviously the slight elongation which is observed when a bar is magnetised should be expected. Ewing has modified and improved Weber's theory to a large extent. Magnetic saturation is obtained when all the molecules point in the same direction.

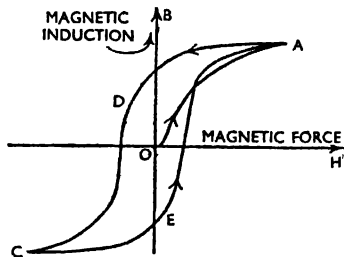


FIG. 22

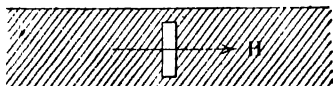


FIG. 21

magnetisation than steel. **Susceptibility** is measured by the ratio of the intensity of magnetisation to the magnetic field. This magnetic field is that field actually within the bar. If a narrow crevasse (Fig. 21) were cut in the iron perpendicularly to the magnetising field H , the force on a unit positive pole placed in this crevasse is defined as the magnetic induction, B . It can be proved that $B = H + 4\pi I$, where I is the intensity of magnetisation. Therefore $B = H(1 + 4\pi K)$ (where K is the susceptibility). The ratio of the magnetic induction in the iron to the magnetic field is called the *magnetic permeability*, μ .

$$\therefore \mu = 1 + 4\pi K.$$

If a bar of iron is placed in a magnetic field, which is gradually increased in intensity from zero, it is found that the relation between B and H , when plotted, gives a curve such as OA (Fig. 22). When the magnetic force is reduced, the relation between B and H does not give the curve AO , but another curve such as ADC . In fact, the iron may be taken through a cycle such as $ADCEA$. The name of *hysteresis* has been given to this phenomenon. The iron seems to retain its induction.

Theories of magnetisation.—Weber suggested that an iron bar consists of a vast number of magnetised molecules. When it is unmagnetised, these molecules have

Terrestrial magnetism.—The declination can be found by suspending a magnet and thus finding the direction of the magnetic meridian. If the direction of the geographical meridian is known at the place of experiment, the declination is easily determined. The dip is found by means of an instrument called the dip circle. This in essence is a magnetised needle suspended so as to revolve freely about a horizontal axis. The angle of dip, i.e. the angle the needle makes with the horizontal, is read off on a circular scale. For the corrections to be applied in the use of the dip circle and declinometer, the reader should refer to larger works.

To find H .—We know that a bar magnet produces a field of intensity $2M$ at a point end on to it, and at a distance r . Thus a compass needle will be deflected through an angle θ , where $2M = H \tan \theta$, if placed at the point.

Thus we have one relation between H and M . If now the bar magnet is suspended so as to be in a horizontal position and it is allowed to oscillate, its period can be

proved to be $2\pi \sqrt{\frac{k}{MH}}$ (where k is the moment of inertia of the magnet). Thus we have a second relation between M and H , if the period is accurately determined. Thus we can find M and H . The dip and the declination and H are now known. It is then easy to determine the vertical component of the earth's field and the total intensity I (say). For $I = \frac{H}{\cos i}$ (where i is the dip) and $V = I \sin i = H \tan i$.

(3) **CURRENT ELECTRICITY.**—About 1786 Galvani noticed that the leg of a frog contracted under the influence of a discharge from an electrical machine. He thought that it was due to some property of the animal. In 1800 Volta showed that this was not so, and also invented a pile known by his name. It consists of a series of little disks of zinc, copper, and paper moistened with brine, placed one on top of the other, starting with zinc and finishing with copper. This is really a primitive primary battery. Faraday was the first to show that the current got from such a pile is the same as an electrostatic current, save that the former is a huge quantity of electricity driven under a small difference of potential, whilst the latter is generally a small quantity of electricity driven under a very large difference of potential.

Electric cells.—See CELL, VOLTAIC.
Magnetic effects of a current.—In 1820 Ørsted discovered that a compass needle was deflected when brought near to a wire through which a current is passing. This

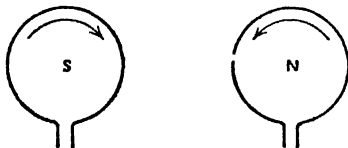


FIG. 23

showed that the current gave rise to a magnetic field surrounding the wire. The following rule of Ampère gives the direction of deflection of the compass needle. Imagine yourself swimming in the wire in the direction of the current and with your face towards the compass needle. Then the north pole of the needle will be deflected towards your left hand. Ampère and Weber experimented on coils, and showed that they acted like magnets of the same shape and size as the coils, and of suitable strength. Thus, a long helical coil, called a solenoid, when suspended so as to swing freely, sets, when a current is passed through it, like a magnet of the same length and shape. As the length of the solenoid is shortened, the length of the equivalent bar magnet is shortened also. Thus, when we have one single turn of wire, the equivalent magnet is a disk magnetised perpendicularly to its plane. Such a disk is called a **magnetic shell**. If this single coil is held so that its face is perpendicular to the line of sight, and if the current appears to pass round the coil in the clockwise direction, then that face will have south-seeking polarity (Fig. 23). The opposite face will have north-seeking polarity. This relation between a magnetic shell and a coil carrying a current holds for a coil of any shape and size, the equivalent shell being of the same size and form as the coil and having its edge coincident with the wire carrying the current. It

has been seen that the effect of a bar magnet at external points depends on its moment. The strength of a shell is defined as the magnetic moment per unit area. The electro-magnetic unit of current can be defined as that current which is equivalent to a magnetic shell of unit strength. If two circular coils carrying currents are placed parallel to each other it is obvious that they will attract each other if the currents flow in the same direction, and repel if they flow in opposite directions. It has been shown that the potential of a magnet of moment, M , is $M \cos \theta$ (where θ is the angle which the

magnetic axis makes with the line joining the point and the centre of the magnet). Let S be the strength of a shell, i.e. magnetic moment, per unit area, i.e. V , the potential at a point, is equal to $S \alpha \cos \theta$ (where α is the area). But

$\cos \theta$ is the solid angle subtended at the point by the shell. Thus $V = S\Omega$ (where Ω is the solid angle). We defined the unit current as equivalent to a shell of unit strength. Thus the magnetic potential due to a coil carrying a current, c , at a point is $V = c\Omega$. Consider a point, P , very near the plane of the coil on the side which has north-seeking polarity, and Q , a point on the opposite side of the plane. The solid angle subtended at P by the coil, or its equivalent shell, is 2π , and that at Q is -2π . Therefore the difference of potential between P and Q is $4\pi c$. Thus the work done in taking a unit pole from P to Q by a path around the edge of the shell is $4\pi c$. If there were a shell actually in place of the coil, we should have to finish the circuit by passing from P to Q through a hole in the shell, and the work already done would be reversed, making the total work zero. In the actual case, there is air between P and Q , and thus there is no discontinuity of force. Therefore, since P and Q are very close together, the work from Q to P is negligible. Thus the work done in taking unit positive magnetic pole around a circuit once is $4\pi c$.

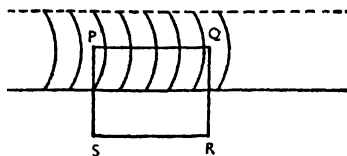


FIG. 24

Force inside a solenoid.—Let a unit positive magnetic pole be taken along PQ (Fig. 24) parallel to and inside the solenoid. Then let it be brought out perpendicularly to PQ between the coils along QR , then along RS parallel to QP , and finally along SP , through the coils, back to P . The work done for each turn

of wire is $4\pi c$; thus, if there are n turns in unit length, the work done is $4\pi ncl$ (where $l = PQ$). The lines of force due to a solenoid are similar to those of a magnet, except that instead of ending at the poles they pass inside the coil. Thus the lines are crowded inside the coil, whereas if the coil is long, the number in the region of RS is small; thus the work done from R to S can be neglected. There is no work done along QR and SP because these lines are normal to the lines of force. Therefore, if H is the intensity inside the solenoid HI is the work done along PQ and is equal to $4\pi ncl$. Thus $H = 4\pi nc$.

Force due to straight current.—Suppose the current is flowing along an infinite straight wire of which AB (Fig. 25) is a portion. Imagine a circle drawn around AB, and a unit positive pole taken around this circle. The lines of force surrounding AB are circles, since the magnetic field of the equivalent shell is perpendicular to the surface. The plane of these circles is perpendicular to AB. The work done in

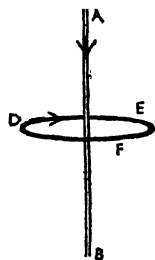


FIG. 25

traversing the circle DEF with the unit pole is $4\pi c$. The intensity H is constant around the path since DEF is a line of force. Thus the work done is also $2\pi rHI$. Therefore

$H = \frac{2c}{r}$ (where r is the radius of the circle). The electro-magnetic unit of current has been defined as that current flowing in a coil which has an equivalent magnetic shell of unit strength. It may also be defined, in a more practical form, as that

current which, flowing in unit length of wire bent into an arc of unit radius, exerts unit mechanical force on a unit positive magnetic pole placed at the centre of the arc. Thus the force at the centre of a circular coil of radius, r , is $\frac{2\pi c}{r}$, and is perpendicular to the plane of the coil. It can be shown that the force at a point P on the normal to the coil, through the centre O, is $2\pi c \frac{r^2}{(r^2 + x^2)^{3/2}}$ (where $x = OP$).

Galvanometers.—The magnetic force produced by currents may be used to measure the intensity of the current. This was at one time done by means of a tangent galvanometer, which consists of a circular coil of wire placed with its plane in the magnetic meridian. If the magnetic field is not wholly that due to the earth, the plane of the coil must contain the resultant magnetic force. At the centre of the coil there is a short magnet which can turn freely about a vertical axis. When no current is in the coil, the magnet will have its axis in the plane of the coil. A current in the coil produces a field at its centre at right angles to the plane of the coil. Let this field be Gc

(where c is the current). G is called the *galvanometer constant*. Thus, if H is the magnetic intensity at the centre of the field when no current is in the coil, the resultant has components Gc perpendicular to the coil and H parallel to it. We have already proved that in such a case the magnet will be deflected through an

angle θ , where $\tan \theta = \frac{Gc}{H}$. Thus we see

that the current is proportional to $\tan \theta$. Hence the name tangent galvanometer. One type of tangent galvanometer has a long thin pointer attached to the magnet and perpendicular to it. This pointer moves over a horizontal circular scale, and thus θ can be read off at once by reading off the deflection of the pointer. This simple type of galvanometer is now obsolete. It is obvious, however, that if H is decreased, the galvanometer is more sensitive. Thus a sensitive galvanometer (devised by Lord Kelvin) carries a control magnet above the coil which can be adjusted to make the field of force at the centre of the coil a minimum when no current is passing in the coil. Also the magnet consists of a few strips of magnetised watch spring fixed on the back of a small mirror which is suspended by a fibre of silk so as to hang with its plane vertical. The angle θ is measured by noting the deflection of the image of a spot of a light reflected from the mirror on to a graduated scale. The sensitiveness of a tangent galvanometer may also be increased by using it in an *astatic* manner. Two small magnets are hung, as shown in Fig. 26, from the same silk fibre so that their axes are in opposite directions. Each magnet is the centre of a coil. These coils are in the same plane, and arranged in series such that the currents in them are in opposite directions. It is obvious that the restoring couple on this system due to H is very small, because the effect on one magnet neutralises that on the other, whilst that due to the force arising from the current is very great.

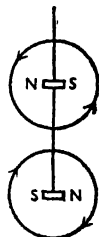


FIG. 26

Sine galvanometer.—This is similar in arrangement to the common tangent galvanometer first described. The coil is first placed in the magnetic meridian. The magnet will also point in this direction. A current is now passed through the coil and the magnet deflected. The plane of the coil is now rotated until it contains the direction of the magnetic axis in its deflected position. If ϕ is the angle of deflection of the magnet, it is easy to show that the current $c = \frac{H}{G} \sin \phi$. Hence

the name sine galvanometer. This instrument is now also obsolete.

D'Arsenval galvanometer.—In this galvanometer the coil carrying the current moves whilst the magnet is fixed. The coil consists of a number of turns of fine wire. It is suspended by very fine metal wires which also serve to convey the

current to the coil. The coil moves between the poles of a horse-shoe magnet, and the field is intensified by a fixed cylinder of soft iron inside the coil. When a current passes through the coil it tends to place itself so as to include as many tubes of induction as possible, i.e. it tends to place itself at right angles to the lines of magnetic induction. The motion of the coil is resisted by the torsion of the wire. Equilibrium is attained when the couple due to torsion just balances that due to the coil's tendency to turn. It can be proved that in such a state the current C is equal to $\frac{k\theta}{BAn}$ (where θ is the deflection, k is a constant, B is the magnetic induction, A the area of the coil and n is the number of turns of the coil). A mirror is attached to the coil, so that θ can be determined with accuracy by the method already mentioned for the sensitive tangent galvanometer or a light pointer is attached to the coil.

Ballistic galvanometer.—A tangent galvanometer may be used to measure the total quantity of electricity passing if the time taken for it to pass is very short. If θ is the throw of the magnet, i.e. the first deflection produced after the electricity has passed, it can be proved mathematically that Q , the quantity of electricity passed through the coil, is equal to $\sin \frac{1}{2} \pi \frac{TH}{nG}$ (where T is the period of swing of the magnet, H the intensity at the centre when no current is in the coil, and G the galvanometer constant). It should be noticed that for the simple tangent galvanometer it has been proved that the force at the centre of the coil when unit current passes in it is $\frac{2\pi n}{r}$. This is, therefore, equal to G .

Soft iron instruments.—Soft iron electro-magnetic instruments may be used in cases where a high degree of accuracy is not needed. Many types are in general use, but the general principle on which they are all based is that a piece of soft iron when placed in a magnetic field which is not uniform tends to move from weak to strong portions of the field. In most instruments the piece of iron is flat and is egg-shaped, and is made so that it can be just inside a coil of wire; when a current is passed through the coil, the iron is sucked further into the coil, and when the current is less, the iron tends to fall to its normal state. The moving portion has the pointer of the instrument fixed to it, and it is controlled by small weights; the instrument has to be carefully fixed so that it is exactly upright, otherwise it will not register truly. A more accurate type of soft iron instrument is described under ELECTRIC CIRCUIT—Measurement of alternating currents.

Electromotive force and resistance.—When an electric current flows along a wire we conceive that electricity is passing, and thus the ends of the wire must be maintained at a permanent difference of potential. This difference of potential is called electromotive force (E.M.F.). The

electromotive force between two points is thus defined as the work which must be done in conveying unit quantity of electricity from one point to the other, against the electric force. We have already defined the electro-magnetic unit of current. The electro-magnet quantity is that quantity of electricity conveyed past a point by an electro-magnetic unit of current in unit time. The electro-magnetic unit of electromotive force is thus defined as the difference of potential which must exist between two points when unit work is done in conveying unit electro-magnetic quantity in unit time. The practical unit of E.M.F. is the volt, which is 10^8 times the electro-magnetic unit. The practical unit of current is the ampere, which is one-tenth of the electro-magnetic unit. In 1827 Dr. Ohm found that the current strength in a wire is proportioned to the applied E.M.F. Ohm verified this by showing that along a homogeneous linear conductor the rate of fall of potential is constant. If C is the current and E the electromotive force, then by Ohm's law $e = kE$ (where k is a constant, and known as the conductivity of the conductor). In other terms $c = \frac{E}{R}$ (where R is a constant, called the resistance of the conductor, which only depends on the nature, dimensions, and temp. of the conductor). It became possible at once to measure two resistances by applying the same electromotive force and comparing the currents produced. The unit of resistance must evidently be defined as the resistance in which unit E.M.F. produces unit current. If electro-magnetic units of E.M.F. and current are employed, the electro-magnetic unit of resistance follows. If practical units are employed, viz. the volt and ampere, then the practical unit of resistance, called the ohm, follows. The ohm is 10^9 times the electro-magnetic unit.

Resistances in series.—Suppose AB, CD (Fig. 27) are a number of conductors joined together in series, the potential of

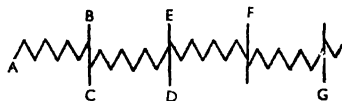


FIG. 27

the end B will be the same as that of C, that of D the same as that of E, and so on. Let E_1, E_2 , etc., be the potential differences between the ends of the different conductors, r_1, r_2 their resistances. The current, c , must be the same for all, since electricity does not accumulate. Therefore $c = \frac{E_1}{r_1} = \frac{E_2}{r_2} = \dots$. If R is the effective resistance of the combination, then $c = \frac{E}{R}$ where $E = E_1 + E_2 + \dots$. Thus $cR = (r_1 + r_2 + r_3 + \dots)c$, $R = r_1 + r_2 + r_3 + \dots$.

Resistances in parallel or multiple arc.—Suppose the beginnings of all the conductors were joined together and all their ends (Fig. 28). They are then said to be in multiple arc. The current, c , flowing

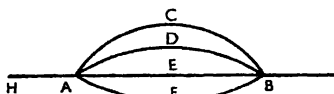


FIG. 28

along HA and in at A, must equal $c_1 + c_2 + \dots$, the sum of the currents in the conductors ACB, ADB, etc. Now $c_1 = \frac{E}{r_1}$, $c_2 = \frac{E}{r_2}$, and so on, since the potential difference between the ends is the same for all the branches, $\therefore c = E \left(\frac{1}{r_1} + \frac{1}{r_2} + \dots \right) = \frac{E}{R}$, if R is the effective resistance of the whole combination. Thus $\frac{1}{R} = \frac{1}{r_1} + \frac{1}{r_2} + \dots$

Kirchoff's laws enable us to apply our results to any complex network of conductors. They are: (1) *The algebraic sum of the currents which meet at any point is zero.* (2) *In any closed circuit the algebraic sum of the products of the current and resistance in each of the conductors in the circuit is equal to the E.M.F. in the circuit.*

Wheatstone's bridge.—Wheatstone made use of a combination, which goes by his name, to determine the ratio of resistances. Suppose the circuit of a voltaic cell

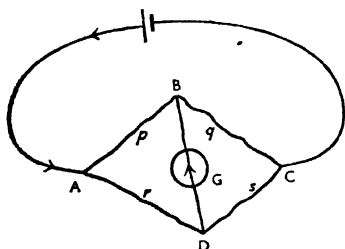


FIG. 29

branches off at A (Fig. 29) into two arms, ABC and ADC, as shown, which rejoin at C. Let the current flow from A to C. Consider a point, B, in the arm of C. Its potential, V_B , must be intermediate between the potential V_A at A and V_C at C. The potential in the arm ADC gradually falls from V_A to V_C as we pass from A to C. Thus there must be some point, D, where the potential is the same as that at B. If now B and D were joined to the terminals of a galvanometer, no current would flow in it. When this is the case, let c_1 be the

current in ABC, and c_2 that in ADC. Let p, q, r, s be the resistances of the parts AB, BC, CD, DA respectively. By Ohm's law, $V_A - V_B = pc_1$, $V_B - V_C = qc_1$, $V_A - V_D = rc_2$, and $V_D - V_C = sc_2$.
 $\therefore V_A - V_B = p$ and $V_A - V_D = r$
 $V_B - V_C = q$ and $V_D - V_C = s$
 but $V_B = V_D$, since there is no current through the galvanometer. Thus $\frac{p}{q} = \frac{r}{s}$.

Thus if the ratio $\frac{p}{q}$ and the resistance, r , is known, we can find s . There are two laboratory instruments based on these principles, the metre bridge and the post-office box. In the metre-bridge a long, thin, uniform wire, AB, is stretched alongside a scale (Fig. 30). The ends are soldered to thick copper bars, AH and BD, of negligible resistance. GE is another thick copper bar. A known resistance, R , is placed in the gap HG, and the unknown resistance, S , in gap ED. A galvanometer is connected to the

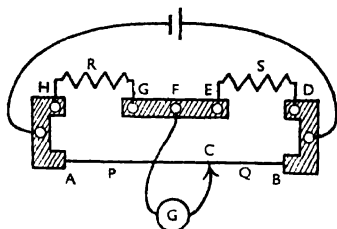


FIG. 30

copper bar, EG (at F), on the one hand, and to a movable jockey, C, on the other. The bars AH and BD are connected to the terminals of a battery. The movable jockey, C, is moved along the wire until no deflection of the galvanometer is noticed. We have then the relation that $R = \text{resistance of AC}$. If the wire is uniform the ratio of the resistances of AC and BC is equal to the ratio of their lengths, which can be read off. A modification of this bridge has been devised by Carey Foster for accurate work. In the post-office box the resistances p, q , and r are all arranged in a box. The arrangement is shown in Fig. 31. A number of brass blocks are connected together, inside the box, by carefully adjusted resistance coils of various values. By inserting a plug between adjacent brass blocks, the resistance that was connecting those blocks is thus cut out. In the actual arrangement the resistances of the arms AC and CB are such that p may be made 10 or 100 times as great as q and vice versa. The resistance in the arm AD may be made anything from 1 ohm to 10,000 ohms. The unknown resistance is inserted between B and D, the galvanometer between D and C, and the battery between A and B. Both the galvanometer connection and the battery connection can be

made or broken by means of the keys K_1 and K_2 , respectively. When no current flows in the galvanometer, when K_1 and K_2 are pressed down in the order named, the relation $\frac{p}{q} = \frac{r}{s}$ holds. Thus S can be

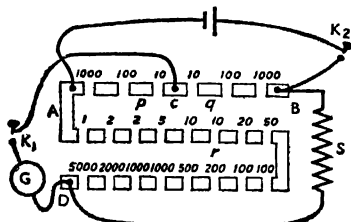


FIG. 31

found with considerable accuracy. The resistance of a galvanometer can be found by inserting it in the arm BD instead of S . No galvanometer is then used in the arm DC, and the resistance r is adjusted until the galvanometer deflection remains unchanged when K_1 is opened and closed. The usual relation holds, where the unknown resistance, S , is that of the galvanometer. With moving coil instruments, however, it is better to clamp the coil of the galvanometer under test, place it in the arm BD and measure its resistance in the usual way with the aid of a second galvanometer in the arm DC. The resistance of a cell also can be found by placing it instead of S in BD and removing the battery in the arm BA.

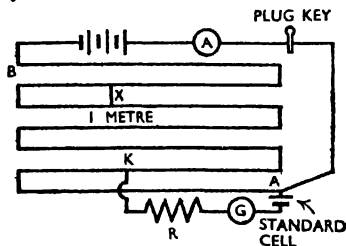


FIG. 32

The Potentiometer is one of the best methods of comparing or measuring potential differences or electromotive forces. It possesses three main advantages over any other method, namely: (a) it is a 'zero' method, i.e. one in which no deflection has to be observed; (b) in measuring the E.M.F. of batteries no current is taken from them; hence the true E.M.F. may be found; and (c) as no current passes through the galvo and battery it gives the accurate measurement of current and resistance facilitating the verification of the accuracy of ammeters and voltmeters. In its simplest form the potentiometer (see Fig. 32) consists of seven wires

of manganin or platino-iridium, each 1 metre in length, the wires being joined in series by thick copper strips. The potentiometer wire is connected in series to indicate any fluctuations in the current during the test. A standard cell (1.434 volts) is connected to the end A; the negative terminal being joined through a galvo (G) a resistance (R) to the sliding contact (K) which is placed 143.4 cm. from A: the difference of potential produced by the battery between A and K tends to send a current through the circuit A G R K while the E.M.F. of the standard cell tends to drive current in the opposite direction, and by adjusting the current in the potentiometer the P.D. between A and K can be made to equal the E.M.F. of the standard cell, and under these conditions no current will flow in the standard cell circuit and no deflection of the galvo will be produced; such a condition is effected by adjusting the jockey X. When this condition of balance is obtained, the resistance (R) is removed to obtain greater selectivity, and X further adjusted to obtain no movement of the galvo. It is clear that the P.D. between A and K is then 1.434 volts, which corresponds to 0.01 volt per cm. length of AK.

Specific resistance.—Imagine a cube of the substance whose edge is 1 cm. The resistance between opposite faces of this cube is called the specific resistance of the substance. It is obvious from the relation between resistances in parallel that the resistance of a wire varies inversely as its cross section.

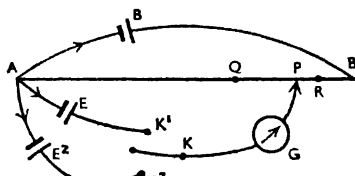


FIG. 33

Comparison of electromotive forces.—Electromotive forces may be compared electrostatically by means of a quadrant electrometer. A more useful method is the potentiometer method, based on the application of Ohm's law. A long thin wire, AB, of high resistance is stretched by the side of a scale (Fig. 33). A constant current is passed through the wire by means of a battery, B. The potential falls gradually and evenly along AB if the wire is uniform. Thus if the cell to be tested, whose E.M.F. must be less than that of B, is connected as shown, a point such as P will be found, which will give with A a difference of potential equal to the E.M.F. of the cell. There will then be no current in the galvanometer when the key K_1 is pressed. Suppose Q was the point found for the cell E_1 , at which no current flowed in the galvanometer. Suppose R is the point found for a standard

cell of known E.M.F. (E'), then the ratio of the E.M.F. of the unknown cell is to that of the standard as $AQ : AR$. Thus we can find the unknown E.M.F. By means of a three-way key, $K'KK'$, the standard cell can be quickly changed for the unknown. The older type of standard cell used in these experiments was the *Clark cell*. It consists essentially of mercury in contact with a paste of mercury sulphate, on which rests a solution of zinc sulphate, kept saturated by the presence of crystals of the salt. In this solution dips an amalgamated rod of pure zinc. A platinum wire dipping into the mercury forms the positive pole of the cell. Nowadays a Weston standard cell is more often used. This is generally similar to the Clark cell, but the zinc sulphate is replaced by cadmium sulphate and the zinc rod by an amalgam of cadmium. A *storage cell*, or accumulator, is usually used for the purpose of obtaining a current. This is described under **ELECTROLYSIS**.

Heating effects of electric currents.—The conversion of energy from an electrical form into that of heat takes place when current flows through a conductor, the incandescent lamp being a particular example, in which case approximately 95 per cent of the power is dissipated into heat and only 5 per cent converted to light energy. The power, in watts, absorbed by a circuit is the product of the current in amps, and the voltage in volts. This may be expressed by the expression $W = EI$. The energy, in joules, absorbed by this circuit in t secs. $= EI = I^2Rt$, since 1 joule = 1 watt second. If no mechanical work is done, all this energy is transformed into heat, and in so doing a certain amount of energy is expended. There is a relation between energy expended and heat produced, and the relation is such that if 4.2×10^7 ergs., i.e. 4.2 joules, of work are done, a quantity of heat is developed sufficient to raise 1 gm. of water 1 centigrade degree. This is known as the calorie or metric unit. The Brit. thermal unit is the Brit. heat unit, and is the quantity of heat required to raise 1 lb. of water through 1° Fahrenheit, and is equivalent to 778 ft.-lb. of work. Now I^2Rt is measured in joules, hence the quantity of heat (H) developed in t secs. in a circuit of which the resistance is R ohms and the current I amps. is given by: $H = \frac{I^2Rt}{4.2} = 0.24 I^2Rt$ calories. This

is known as Joule's law, and the heating effect as Joule's effect. The law may be expressed in words as follows. The heat generated in a simple circuit is proportional to the product of the square of the current, the resistance, and the time in sec. during which the current continues to flow.

Thermo-electricity.—Seebeck found in 1821 that if a circuit consisting of two dissimilar metals be taken and the junctions kept at different temps., a permanent current will flow in the circuit. The two metals are said to form a thermocouple, and the Seebeck effect is now widely used for the measurement of temp. In 1834 Peltier found that when a current was

passed across a junction of two dissimilar metals reversible heating effects occur. Heat is evolved when the current passes one way across the junction and absorbed when it passes in the opposite way. This is called the Peltier effect. From mathematical reasoning we should expect that if a circuit were made of two dissimilar metals and one junction were kept at a constant temp., the E.M.F. in the circuit should increase as the temp. of the other junction increased. It is found, however, that as the temp. of the second junction is gradually raised, the E.M.F. increases to a certain limit, then decreases again, and is finally reversed. Lord Kelvin found that when a current flows along a wire of which the temp. varies from point to point, heat is liberated at a given point in the wire when the current is flowing in one direction, and absorbed when the current is in the opposite direction. This reversible heating effect is known as the Thomson effect, and can be applied to explain the discrepancy alluded to above. For a fuller account of the Peltier and Thomson effects and their mathematical treatment, the reader should consult standard works on electricity.

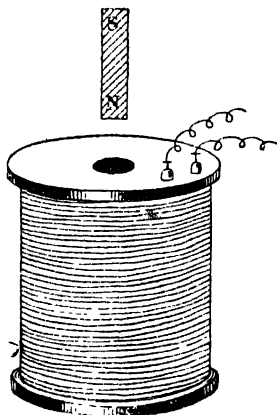


FIG. 34

(4) **ELECTRO-MAGNETIC INDUCTION.**—Faraday was the first to discover the phenomenon of electro-magnetic induction. The following are practically the same experiments that Faraday performed. Take a cylindrical coil consisting of many turns of fine wire wound on a hollow reel (Fig. 34). Connect the ends of the coil to a delicate galvanometer. Bring the N. pole of a magnet rapidly towards one end of the spiral. The needle of the galvanometer will be deflected in one direction. Now suddenly withdraw the magnet again. The needle is deflected in the opposite direction. It can be seen that the deflection is not permanent, but only takes

place just as lines of force are being introduced into, or taken away from, the coil. It can be shown that the current induced is also proportional to the rate at which the magnet is introduced. Now, instead of the magnet, use a coil wound on a thin cylinder through which a steady primary current is flowing. It will be seen that when this primary coil is introduced deflection of the galvanometer needle takes place, and when it is withdrawn a deflection in the opposite direction occurs. It can also be noted that a current is induced in the coil, which is called the secondary coil, in the same direction as the primary current whenever the number of tubes of magnetic induction threading the secondary circuit is *diminished*, and in the contrary direction if the number is increased. Thus attraction will occur between the coils when the tubes are diminishing, that is, when the primary coil is being removed, and repulsion when it is being brought nearer the secondary coil. Thus the induced current is such that it tends to stop the motion producing it. This is Lenz's law. Faraday, from the result of his experiments, explained the action of Arago's disk. This consists of a compass needle placed above a horizontal copper disk which is rotating in its own plane. It is found that the needle moves with the disk. Faraday stated that by the motion of the disk relative to the needle, eddy currents were induced in the disk, and these were such that they tended to stop the relative motion of the needle and disk. Thus the needle is dragged around with the disk. It is found that currents are produced in the secondary coil when the current in the primary coil is suddenly stopped or commenced. Faraday showed experimentally with his apparatus that the induced current in the secondary coil is proportional to the *rate of change* of the number of tubes of force threading the coil. It has been proved mathematically and demonstrated experimentally that the induced E.M.F. is the rate of decrease of the tubes of magnetic induction threading the secondary coil.

Coefficients of induction.—The number of tubes of magnetic induction which thread a circuit when unit current is flowing round it is called the coefficient of self-induction of the circuit. It is obvious that when the current is stopped, these tubes suddenly diminish. A current is then induced in the primary coil itself such that it tends to prolong the primary current. When the current is started the induced current in the primary coil tends to prevent the current starting. The number of tubes of magnetic induction threading a circuit when unit current passes through another is said to be the coefficient of *mutual* induction of the two coils. We know that the field inside a solenoid when unit current is passing is $4\pi n$, where n is the number of turns per unit length. The area of a single turn is πr^2 , and thus that of n turns is $\pi r^2 n$ (it is the length of the solenoid). Thus the self-induction of the solenoid is $4\pi n^2 r^2 l$. This discovery of electro-magnetic induction has led to vast progress in electric

machines. Practically all modern electrical machinery depends on the induction of currents.

The *Ruhmkorff induction coil* enables us to obtain an intermittent current at high voltage from a low voltage direct current. The primary coil, P (Fig. 35), consists of a few turns of *thick* copper wire. The secondary coil, S, is wound over the primary, and consists of a vast number of turns of very fine wire. Both the coils are wound on a bundle of soft iron rods, A.B. The primary current, which is supplied by a cell or number of cells, C.D, is

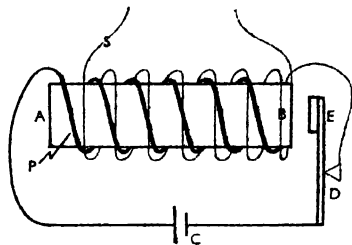


FIG. 35

broken at frequent intervals of time. One method of doing this is as follows: One terminal of the primary coil is connected to a fixed platinum stud, D, the other terminal to a spring which carries a piece of soft iron, E. When the spring is unbent it touches the stud D and a current passes in the primary. The core of soft iron becomes magnetised and attracts the soft iron disk, E, thus breaking contact at D. The current is stopped, and the core immediately becomes unmagnetised, the spring flies back and contact is again made. The process is then repeated. When the contact in the primary is broken, a current flows in one direction in the secondary coil, when it is made the current flows in the opposite direction in the secondary. Thus an alternating current of high voltage is set up in the secondary. In practice a condenser (not shown in the diagram) is connected between C and D, and in parallel with the spark gap at D. One function of this condenser is to suppress sparking at the gap, and it causes the decay of current in the primary coil to be much more rapid than its growth, with the result that the intermittent current in the secondary is practically a unidirectional one.

(5) **ELECTRO-MAGNETIC WAVES AND MAXWELL'S THEORY.**—Faraday was the first to consider the dielectric as the seat of all electrical processes. Suppose we have an alternating current in one circuit inducing an alternating current in a secondary circuit at some distance away. To originate a current in a conductor means expenditure of energy. We believe in the conservation of energy, so that if energy disappears at one place and reappears at another, it must have passed

through the intervening space, and existed there somehow in the meantime. A wave motion of some kind is suggested, and a vehicle is necessary to convey those waves. It is known that the propagation of light is a wave motion, and the vehicle necessary for this propagation is the ether. Maxwell, in his theory, declared that it was not philosophical to fill all space with a new medium for every new wave motion that appears. Thus if it could be shown that some property of the medium necessary to convey electro-magnetic waves is identical with some property of the medium necessary for conveying light waves, we should have strong reason for believing that the medium was identical for both phenomena, and that light is an electro-magnetic phenomenon. Thus, says Maxwell, if we can prove that the velocity of electro-magnetic waves is the same as that of light, we should have strong reason for stating that light was an electro-magnetic phenomenon.

Mode of propagation of electro-magnetic disturbance.—Let A and B (Fig. 36) be the two vertical armatures of a plate condenser. Faraday conceived the idea of

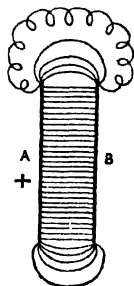


FIG. 36

tubes of force which passed from the positive armature, A, to their negative armature, B. These tubes are horizontal except near the ends, when they are curved as shown. Each tube has a positive charge at one end and a negative charge at the other. Faraday showed that if these tubes were supposed to be in a state of tension and also to exert a lateral force one on the other, then all phenomena of the electric field could be explained. Suppose that A and B were suddenly connected near the top by a wire, the plates would be discharged. There would be a flow of positive electricity up one plate and of negative electricity up the other. As the process goes on the tubes move parallel to themselves towards the wire with a definite velocity. They contract into the wire and disappear. The motion of these tubes gives rise to magnetic force and induction in the medium between the plates. From mathematical analysis Maxwell showed

that the velocity, v , of the tubes of force is equal to $\frac{A}{\sqrt{K\mu}}$ (where A is the ratio o

an electro-magnetic unit of current to the electrostatic unit, K is the specific inductive capacity of the medium, and μ its magnetic permeability). Maxwell stated that this velocity is that of an electro-magnetic disturbance in this medium, and obtained the same expression by other modes of analysis. Thus in air for which K and μ are each unity, the velocity of an electro-magnetic wave should be A. It has been proved by experiment that A is very closely equal to the velocity of light. Thus Maxwell's theory of light is considerably strengthened. Again, the ratio of the refractive indices of two substances (see LIGHT) is the ratio of the velocity of light in the two media. From Maxwell's

theory this ratio should be $\frac{\sqrt{K_2}}{\sqrt{K_1}}$, i.e.

inversely as the square roots of the specific inductive capacity. Experiment has shown that for electro-magnetic waves of frequencies comparable to those

of light the ratio $\frac{\sqrt{K_2}}{\sqrt{K_1}}$ does approximate

to the ratio of the refractive indices. Besides this, Maxwell's theory is the only theory that explains all observed phenomena in light.

Electric waves.—About thirteen years after Maxwell pub. his theory, Hertz made known the fact that he had produced and detected electro-magnetic waves, and also that their velocity was approximately that

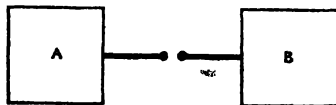


FIG. 37

of light. It can be shown that the discharge of an electrified system of capacity, C, through a circuit of self-induction, L, is oscillatory and of period $2\pi\sqrt{LC}$. The oscillations, however, rapidly die away. It is known that a vibrating tuning fork held near an open pipe will throw the air column into vibration, and elicit a note from the pipe if the length is adjusted so that its period is the same as that of the fork. In a similar way an oscillating discharge in a circuit will produce an electric oscillation in another circuit which possesses the same periodic time. It was on this principle Hertz worked. Fig. 37 shows the simple vibrator used by him. It consists of two brass plates, A and B, to each of which is attached a stiff wire carrying a brass knob. These are gilt and placed about two or three millimetres apart, so that when A and B are oppositely electrified a spark passes. Electric oscillation is set up, the spark passing back and forth from A to B. The time of each oscillation in Hertz's experiment was about

of the charge, induced currents appear in neighbouring conductors, and if the periodic time of oscillation in one of these should happen to be the same as that of the vibrator, the oscillations induced in it will become multiplied, and may attain

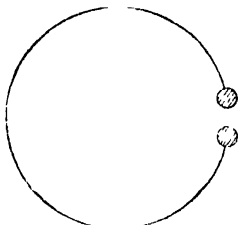


FIG. 38

considerable intensity. The resonator made by Hertz (Fig. 38) consisted simply of a circle of wire, the ends terminating in brass knobs, whose distance apart could be adjusted. The length of the wire was such that its period was the same as that of the vibrator. When the vibrator is in action the induced current swings backwards and forwards in the circle from one knob to the other, and finally attains such a strength that sparking actually occurs between the knobs. For testing the laws of reflection and refraction of waves

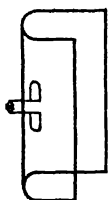


FIG. 39b

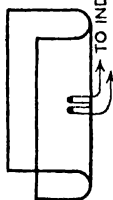


FIG. 39a

Hertz used more delicate apparatus. He concentrated the radiation by use of zinc reflectors bent to the shape of parabolic mirrors. By connecting the knobs of the vibrator to an induction coil continuous sparking takes place. There is then no need for the plates A and B. Figs. 39a and 39b show the vibrator and resonator respectively. With this apparatus he proved that electro-magnetic waves are reflected from the walls of a room. He also had a huge prism made of pitch, and found that the waves were refracted by it. He determined the index of refraction and

found it to be 1.69. The index of refraction of pitch for light waves is between 1.5 and 1.6. The discrepancy is due to the fact that the wave length for electro-magnetic waves is very great compared to that of light, and an agreement can hardly be expected. Hertz placed the receiver in front of a huge sheet of zinc, from which waves from the vibrator were being reflected. By investigating the field in front of the zinc with his resonator he showed that stationary waves were being produced. He was able to find the wave length of the disturbance for a known period of the vibrator. Thus he found the velocity of the electro-magnetic waves and found that it was approximately that of light. He also demonstrated the polarisation of these waves; in fact they behave in all ways like light waves. All these experiments of Hertz go to support Maxwell's theory in a striking way. Practical application of Hertz's results has been made by Marconi and others in wireless telegraphy (q.v.).

(6) ELECTROLYSIS.—In 1800, just after the announcement of the discovery of Volta's pile, Nicholson and Carlisle found

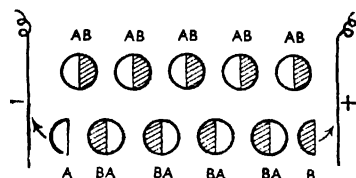


FIG. 40

that if two brass wires leading from the terminals of the pile were immersed near each other in water, hydrogen gas was evolved from one wire whilst the other was oxidised. If platinum wires were used oxygen gas was evolved from the second wire. Also they noticed that the volume of hydrogen was twice that of oxygen. Thus they said that the phenomenon was one of decomposition of water. Soon after this, the chlorides of magnesia and soda were decomposed by the passage of an electric current, and also silver and copper were precipitated from their solutions, an observation which led to the process of electroplating, *see under METALLURGY*. In 1807 Davy obtained potassium and sodium from moist potash and soda by passing a strong current through them, thus laying the foundation of the practical method of obtaining these metals (*see ELECTRO-CHEMISTRY*). The fact that the products of decomposition appear only at the poles was made the basis of a theory of electrolysis by Grotthuis in 1806. Suppose we have a solution of a compound which contains the elements AB (Fig. 40). A molecule of the substance near the positive pole is decomposed into its two atoms A and B. The B atom is set free. The A atom attacks the next molecule, annexing the

B atom to form a new molecule and liberating the A atom which attacks the next molecule, and so on. The last molecule on the chain is attacked and gives up its B atom to the attacking A atom. The A atom thus set free has not another molecule to attack and thus is set free at the negative pole. Thus it is obvious on this theory that the quantities of the elements evolved at the poles are in the same ratio as they occur in the compound. Grotthaus' theory is now known to be incorrect, and modern work is based upon ideas put forward in 1887 by Arrhenius (see ELECTRO-CHEMISTRY, and the article ELECTROLYSIS). Faraday called the poles electrodes, and named the electrode by which the current entered the liquid the anode, and that by which it left the liquid the cathode. He called the liquid through which the current passed the electrolyte. Faraday set to work to determine the relation between the amount of chemical decomposition and the strength of the current. He first showed that when several cells of acidulated water were placed in series and a current passed through, the amount of chemical action was the same in each, even if the electrodes in the various cells were of different metals and of different sizes. He also passed the current through one cell, and then through two in parallel. The amount of chemical decomposition in the first cell is equal to the sum of that in the other two. Faraday so framed his first law, which states that 'the amount of decomposition is proportional to the quantity of electricity which passes.' Thus an apparatus for the decomposition of water can be used to measure quantity of electricity. Such an apparatus is called a *voltameter*. Faraday then examined the amounts of different metals deposited from their solution by the same current and formed his second law, that 'the quantities of substances which separate at electrodes are proportional to the whole amount of electricity which passes and to the chemical equivalent weights of the substances.' The amount in grammes of a substance which is deposited by a current of one ampere flowing for one second is called the electro-chemical equivalent of the substance. The ratio of the electro-chemical equivalents of two substances is the same as that of their chemical equivalents. It has been proved experimentally that Ohm's law is obeyed by electrolytes. The electrolytic cell is placed in the fourth arm of a Wheatstone's bridge arrangement. Owing to polarisation a direct current cannot be used. But if an alternating current is used the effects of polarisation are overcome, because the gas deposited on an electrode by the passage of electricity in one direction is immediately removed by its passage in the opposite direction. An ordinary galvanometer cannot be used to detect an alternating current. A telephone is used instead. The alternating current produces in the telephone a buzzing sound which is a minimum when the current is a minimum. The alternating current is obtained from a small induction coil. It is

found that for very dilute solutions the conductivity (reciprocal of the resistance) is proportional to the concentration.

Theory of voltaic cell.—The source of energy of a voltaic cell is the chemical action. For example, in a Daniell cell there is a solution of zinc in sulphuric acid and liberation of copper from copper sulphate. Energy is evolved in the first action and absorbed in the second. The difference goes to provide energy for maintaining the current and doing external work. The work done by a cell giving a current c is Ect where E is the E.M.F. and t the time. If we know the electro-chemical equivalents of zinc and copper we can determine the amount of zinc dissolved and the amount of copper deposited in time, t , by a current, C . A knowledge of chemistry gives us the data for the amount of energy evolved by the solution of this amount of zinc and deposition of this amount of copper. Thus it is possible to calculate E . The calculated values agree closely with observed

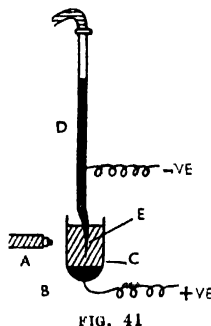


FIG. 41

values of E . The exact seat of the potential difference was debated by physicists for years. Volta located it at the junction of dissimilar metals, Faraday at the junction of the metal and electrolyte. It has been shown by experiment that there is a potential difference between the metal and electrolyte. One instrument used is the capillary electrometer (Fig. 41). It consists of a glass tube, D , drawn out to a fine capillary tube at E . This tube, D , is partially filled with mercury and dips into the electrolyte in a vessel, C . In the bottom of the vessel is placed some mercury, B , which is connected to one terminal of a cell. The mercury in D is connected to the other terminal of the cell. Thus an E.M.F. is applied in the surface between the mercury and the electrolyte. This E.M.F. is adjustable. The surface tension of the area of contact of the mercury and solution at E is affected by its electrical state. There is a certain E.M.F. due to the contact of these liquids. As the applied E.M.F. is gradually increased, having the mercury in D at a

lower potential than the electrolyte, the surface tension of this layer increases, and the mercury in D must be raised to keep the level of mercury in E the same. This is viewed through a microscope, A. As the applied E.M.F. is increased the level in D must be raised till it reaches a maximum, and then it has to be lowered again. The value of the applied E.M.F. at the turning point of the level of mercury in D is equal and opposite to the contact E.M.F. between mercury and the electrolyte. The result of experiments with this electrometer favours the view that the E.M.F. of a cell is the sum of the contact differences of potential between its electrodes and the acid. Polarisation can be explained on this contact potential theory. If the electrodes are platinum and the electrolyte sulphuric acid, hydrogen forms a film on the cathode, and oxygen a film on the anode. The difference of potential of the film of hydrogen and the acid is greater than that between the acid and oxygen. Thus a current tends to flow in the opposite direction to the direct current.

Accumulators.—Suppose an E.M.F. greater than the ordinary E.M.F. of a Daniell cell is applied to it in the opposite direction to its natural E.M.F., a current would flow in the reverse direction, and the chemical actions would be reversed. Such a cell is said to be reversible. Any reversible cell can be used as an accumulator. The usual method is to take two grids of lead as electrodes in sulphuric acid, and to pass a current between them. Hydrogen is evolved at one grid, and a layer of insoluble oxide formed at the other. If left to itself now, a reverse current will flow, and lead sulphate will be formed at both the anode and cathode, until the solutions surrounding them are of equal strength. On recharging, the lead sulphate at the cathode is reduced to spongy lead, whilst lead oxide is formed at the anode. The cell is allowed to discharge again. This process is repeated until a large quantity of spongy lead is obtained. The accumulator is then ready for use. It is charged by connecting to a powerful source of potential difference. It will then give a current for some time without appreciable loss of E.M.F. See (elementary). W. C. Badcock and E. J. Holmyard, *Electricity and Magnetism for Beginners*, 1931; R. J. Mitton, *Electricity and Magnetism*, 1937; (advanced), M. Faraday, *Experimental Researches in Electricity*, 1839–55; J. Clerk Maxwell, *Electricity and Magnetism*, 1873; J. J. Thomson, *Elements of the Mathematical Theory of Electricity and Magnetism*, 1895; Sir J. Jeans, *Mathematical Theory of Electricity and Magnetism*, 1908, 1941; Sir W. Dampier Whetham, *The Theory of Experimental Electricity*, 1905; H. W. Hookstall-Smith, *Intermediate Electrical Theory*, 1932; E. O. Stoner, *Magnetism and Matter*, 1934; N. F. Mott and others, *Magnetism*, 1938; L. F. Bates, *Modern Magnetism*, 1939; C. L. Boltz, *Electricity*, 1948. See also CELL, VOLTAIC; GALVANOMETERS; ELECTRO-CHEMISTRY.

Electro-chemistry deals with chemical changes brought about by the expenditure of electrical energy, and with the production of electricity from the energy transformed during a chemical change. In this short article it will be impossible to deal with the theoretical questions of E.C. in more than brief outline. The methods of preparation of substances by means of electrolysis of solutions at moderate fusion temp. will be considered and also some of the recent applications of electrical methods to chemical analysis and synthesis. For the refining of metals, electro-plating, electro-deposition, and high-temp. furnaces, see METALLURGY. (For the production of electricity see CELL, VOLTAIC; ACCUMULATOR, etc.) There are three main methods by which electrical energy can be made to effect chemical changes.

(1) *By electrolysis of electrolytes.*—Solutions of salts, acids, and bases (e.g. alkalis) conduct electricity, at the same time undergoing decomposition, into the metal and the acid radical, hydroxyl, or halogen; the metal being produced at the cathode and the acid radical at the anode. Water is the solvent generally employed, but for organic substances, alcohol or benzene, etc., may be used. When hydrochloric acid is electrolysed, we have hydrogen liberated at the cathode and chlorine at the anode. Here the primary products of the action are liberated, i.e. H and Cl. Sometimes, however, these products react in the solution. This is the case with potassium hydroxide (KOH). The primary products are potassium and hydroxyl, but unless special methods of prevention are attempted, the products obtained are hydrogen and oxygen, the liberated potassium reacting on the solution at the cathode to give hydrogen according to the equation $2K + 2H_2O = 2KOH + H_2$, while the hydroxyl decomposes to water and oxygen and hydrogen are called secondary products of electrolysis. Grotthaus (1805) evolved the theory that the current first decomposes the molecules of the electrolyte before electrolysis occurred, and this theory was universally accepted until 1887, when the results of Van't Hoff's work on osmotic pressure of solutions was pub. Van't Hoff showed that for dilute solutions the dissolved material was subject to laws similar to those governing the volume and pressure of gases, and as a result of this the theory of Grotthaus lost ground. Arrhenius (1887) advanced the theory of the dissociation of the electrolyte in solution into ions; i.e. atoms or groups of atoms carrying charges of positive and negative electricity. The dissociation is not brought about by the electric current, but the ions exist in the solution irrespective of whether a current flows or not. This theory, together with the discovery of the migration of the ions towards the electrodes, forms the basis of the modern explanations of electrolysis (see SOLUTIONS). The laws of Faraday state that the amount of decomposition is proportional to the quantity of electricity passed through the

solution. Losses by secondary reactions may reduce this theoretical yield and hence the current efficiency of a cell is expressed in terms of the proportion of the actual yield to the theoretical. Again, when an electrolyte is being decomposed by an electric current, a counter E.M.F. is set up in the decomposition cell, and hence the effective E.M.F. is the difference between the total and the counter E.M.F. In order, therefore, to produce an electrolytic deposit the decomposing current must have a higher E.M.F. than that which is set up in the decomposition cell. Thus $E - e = CR$, where e is the counter E.M.F. and R is the total resistance. Also

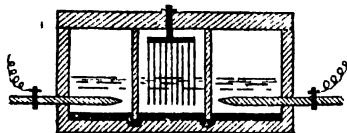
$R = \frac{d}{a} \times \text{specific resistance of the electrolyte}$, where d and a are the distance apart and the area of the electrodes, respectively. For economical working the resistance R must be made as low as possible, therefore the electrodes are set as closely as working conditions permit and are of large area. The specific resistance must also be kept low and this is found to diminish with rise of temp. in the solution, and with increase of the strength of the solution (within certain limits).

Electrodes and cells.—The negative electrode at which the metal is liberated may be of iron, lead, or copper, while the positive electrode may be carbon, platinum, or platinum-iridium alloy with 15 per cent iridium. Cells are made of various materials dependent on the nature of the solution. Wooden cells coated with pitch are used with acid liquors, or lead tanks in the case of H_2SO_4 , while stoneware is used for alkaline solutions. Some few processes and technical cells will now be described.

Sodium by Castner's process.—The method consists in the electrolysis of fused sodium hydroxide, contained in an iron pot. The products of the electrolysis are oxygen, hydrogen, and sodium. The sodium floats on the surface of the molten caustic and is removed from time to time with a perforated ladle which allows the caustic to drain through. The escape of oxygen and hydrogen in this process represents so much waste electrical energy, and attempts have been made to obtain the metal from the fused chloride. Borchers's apparatus is then used, which consists of a U-tube made in two parts, a narrow limb of iron and a broad limb of fireclay. The narrow limb itself is anode, and the sodium produced there flows down a side pipe to a receiver. The chlorine evolved at the anode is led by a pipe to a receiver and used for the manuf. of bleach. The practical difficulties to overcome when using the fused chloride are serious, owing to the higher temp. required and also to the corrosive action of the liberated chlorine.

Brine cells.—The first products of the electrolysis of brine are chlorine at the anode, and alkali hydroxide at the cathode. If these products are required, they must not be allowed to mix; while if hypochlorite, chlorate, or perchlorate are required, the chlorine and hydroxide must be allowed to react with one another.

Castner's process.—A rectangular tank is used, which is divided into three compartments by two non-porous partitions dipping into narrow gutters of mercury which covers the bottom of the tank. The two outside tanks contain brine, in which are gas carbon anodes, while the centre one contains water and an iron grid, which acts as the cathode. The alkali metal is electrolysed into the mercury in the anode compartments, and is electrolysed out in the cathode compartment. In the cathode compartment the mercury amalgam acts as the anode and hydroxide is formed. The whole cell is slowly rocked, causing the mercury to flow from one compartment to another, and so the liberated alkali metal is brought into contact with



ELECTRO-CHEMISTRY: CASTNER'S PROCESS

the water. The chlorine is led off by tubes at the top of the anode compartments to bleach chambers. With a 30 per cent solution at $40^\circ C.$, and a current density of one ampere per sq. cm., the current yield of hydroxide is 90 per cent.

Hargreaves-Bird cell.—This consists of a cast-iron box, divided into three compartments by two asbestos diaphragms made in copper gauze, which forms the cathode. The anode compartment through which brine circulates is the space between the diaphragms, and the anode is a row of gas carbons. No liquid is in the cathode compartment except that which percolates through the diaphragm. Carbon dioxide and steam are blown through the two outer compartments and convert the hydroxide formed on the diaphragm to sodium carbonate.

Hypochlorite cells.—Of these the Kellver cell is one of the simplest. It consists of a glazed stoneware vessel divided into compartments by glass plates which fit into grooves on the side of the cell, and around which is wound platinum-iridium wire. These form the cathode on one side of the plate and the anode on the other. The solution enters through holes in the bottom of the cell and the liberated chlorine and hydroxide react to give hypochlorite which flows out at the top of the cell in a cooling vessel. The solution is treated in the same manner several times until the strength is great enough.

Chlorate cells.—These do not differ materially from hypochlorite cells. Earlier cells, however, used a diaphragm to prevent reduction of the hypochlorite from which the chlorate is produced. Reduction can be avoided now by the use of potassium chromate without the use of a diaphragm. The solution flows continuously through the cell, the flow being

regulated so that the temp. is about 50° C. The percentage of chlorate in the solution is about 3 per cent, and it is crystallised out in cooling vats. Similar cells are used for perchlorates; no description of a special cell has been pub.

Oxygen and hydrogen.—Simple electrolysis of acidulated or alkaline water yields oxygen and hydrogen. Cells are used with iron electrodes placed close together. An E.M.F. of 2½ volts is generally used, and the gases are drawn off under hoods or bells and compressed into cylinders. Many other chemical substances are now prepared by electrolytic methods, e.g. per-sulphates, sodium, peroxide, and organic compounds.

(2) *By electrical discharges through gases*—The fixation of nitrogen by means of electricity has claimed much attention during recent years. When an electric spark is passed through air, nitric oxide is the main product. The reaction is a reversible one, but due to the researches of Nernst and Haber the conditions for the reaction $N_2 + O_2 \rightleftharpoons 2NO$ are well known. It was found that the best yield of nitric oxide is obtained by using a cool high tension arc and reduced pressure, so that little decomposition of the gas takes place. Electrical plants have been estab. in Germany, where air is treated at the rate of about 75,000 litres per min., the yield of nitric acid obtained being 57 grams per kilowatt hr. The production of ozone from oxygen is illustrated in the Siemens-Halske ozoniser. In this, air is subjected to the action of a silent electrical discharge (actually pressures of over 4000 volts are employed) after being dried with calcium chloride. The ozonised air is then used for the sterilisation of water by forcing it against a stream of water to be treated, as it drops down a tower.

(3) *By the production of high temperatures* (Electrothermal). Various electric furnaces have been designed towards this end (see METALLURGY). Carborundum, calcium carbide, graphite (from anthracite), carbon disulphide, and steel (from pig iron) are made by reactions effected by the heat produced in electro-thermal reactions. Other applications of electricity include the settling of dust in gases, and the drying of peat, by using the principle of electro-osmosis (see OSMOSIS).

Electro-chemical analysis.—Four different methods of quantitative analysis are in use, viz.: (1) Potential measurements for determining the concentrations of ions too dilute for gravimetric calculation; (2) conductivity measurements for determining concentrations; (3) titration with a galvanometer in place of an ordinary indicator, and (4) ordinary electro-analysis in which the metal is deposited on a platinum electrode and weighed. The electrolytic method is widely employed, and consists in depositing by electrolysis the substance to be determined on one of the electrodes in a form that can be easily weighed. Metals are deposited in the pure state on the cathode or amalgamated with a mercury cathode. Lead and manganese are deposited as peroxide on the

anode. Using a silver anode, chlorine, bromine, and iodine may be obtained and weighed as chloride, bromide, or iodide of silver. See H. J. S. Sand, *Electro-chemistry and Electro-chemical Analysis*, 1939-41.

Electro-chronograph, see CHRONOGRAPH.

Electrocution, method of inflicting the death penalty by means of a high voltage current passed through the body. First used in U.S.A. in 1888, it is supposed to be less revolting than any other form of cap. punishment (*q.v.*).

Electro-deposition, see METALLURGY.

Electrolysis. Substances behave differently towards the electric current. Some, such as the metals, are conductors of it, while others, like sulphur, are non-conductors. Conductors are divided into two classes. To the first class belong the metals. The passage of an electric current through such conductors is accompanied by a rise in temp., but no other change is evident. Conductors of the second class are chiefly aqueous solutions of acids, bases, and salts, or substances in a state of fusion. When the current traverses these liquids, simultaneously with the conduction of the current, they undergo chemical change, their components being chemically separated. This phenomenon of decomposition by the electric current is termed 'electrolysis,' and the liquid conductors which show it are called 'electrolytes.' The conduction of the current in an electrolytic solution is accompanied by a mechanical movement of the parts of the dissolved substance. These parts are called 'ions,' those moving in the direction of the positive current being the 'cations,' and those in the opposite direction the 'anions.' The solid conductors by which the current passes into the solution are termed 'electrodes.' The electrode toward which the cation moves is named the 'cathode,' that toward which the anion moves the 'anode.' Thus, suppose some copper sulphate is dissolved in water and placed between copper electrodes in a copper voltameter. The mere act of solution causes the appearance of ions of copper, i.e. atoms which are charged with positive electricity, and sulphate ions carrying negative charge. These ions are moving about freely. If a current of electricity is now passed through the solution, the copper ions move towards the cathode, and on arrival there the charge is neutralised by the negative charge at the cathode. They thus become electrically neutral, and are identical with ordinary copper. The metal therefore deposits on the cathode. Similarly the sulphate ions move to the anode, and there neutralisation of charge goes on. Now the sulphate radicle is incapable of separate existence, so the copper of the anode is immediately attacked, giving rise to copper sulphate, which passes into solution. If the same experiment is done, using platinum electrodes, copper is deposited at the cathode as before, but the liberated sulphate radicle immediately attacks the water present to form sulphuric acid and oxygen.

Water is peculiar in that it contains a very small percentage of ions, and is therefore a bad conductor. Faraday, from the investigation of the phenomena, deduced the following laws of E.: (1) The amount of chemical decomposition effected by the passage of the current is proportional to the amount of electricity which flows through the conductor. (2) The amounts of the different elements separated by the same quantity of electricity bear the same relation to each other as the equivalents or combining weights of the elements. If A = amount of material liberated, then $E = C \times t \times e$, where C = current t = time in sec., and e = weights of element liberated by one ampere in one sec., i.e. the electro-chemical equivalent of the element which is proportional to its combining weight. See W. Whetham, *Solution and Electrolysis*, 1895, and H. C. Jones, *Elements of Physical Chemistry*, 1910.

Electrolytic Cells, see ELECTRO-CHEMISTRY, ELECTROLYSIS.

Electro-magnetic Induction, see ELECTRICITY—ELECTRO-MAGNETIC INDUCTION.

Electro-magnetic rotation, Electro-magnetic Theory of Light, and Electro-magnetic Waves, see ELECTRICITY—ELECTRO-MAGNETIC WAVES AND MAXWELL'S THEORY.

Electro-metallurgy, see METALLURGY.

Electrometer, see ELECTRICITY—ELECTRO-STATICS

Electromotive Force (E.M.F.), see ELECTRICITY—Current, and VOLT.

Electron. The elementary corpuscle or 'atom' of negative electricity. All matter is built up of Es, neutrons and protons (see ATOM AND ATOMIC THEORY—Structure and Energy). Plucker (1859) showed that when an electric discharge took place in evacuated tubes, rays were given off from the cathode. Sir J. J. Thomson (1896) proved these cathode rays to be composed of fast-moving particles carrying negative charge. By the application of a magnetic field, they could be deflected, but could be brought back again under the action of an electric field at right angles. The ratio of the mass of an E. to the charge carried by it (m/e) was calculated from these experiments. The value of e was found by Townsend and C. T. R. Wilson by experiments on the condensation of water on charged nuclei when sudden expansion was allowed to take place and more accurately by Millikan, who balanced the weights of small charged droplets of oil or mercury against the forces exerted upon them by an electric field of known strength.

Es. are also given off from metal surfaces when illuminated by ultra-violet light; from incandescent metals at high temps.; from certain oxides at red heat, such as lime; during the bombardment of material objects by X-rays; and from radioactive materials in the form of β -particles. The velocity of an E. varies according to its method of production, but the ratio m/e remains appreciably constant.

Atoms are composed of a central nucleus of protons and Es., surrounded by Es. moving in orbits, some circular, some

elliptical, according to a definite plan. Mass of E 9×10^{-31} gms. Charge of E 1.591×10^{-19} coulombs. See R. A. Millikan, *Electrons, Protons, Photons, Neutrons and Cosmic Rays*, 1935; D. H. Føllet, *Introduction to Electronics*, 1948.

Electron Microscope. When a large wave on the surface of the sea meets one of the piles of a pier it can be observed to divide as it passes the pile, and then to recombine and pass on with its form practically unchanged. On the other hand, ripples or waves of short wave-length are reflected or are broken up into a pattern when they meet such objects, so that whereas it would be impossible to deduce anything about the shapes or positions of the piles by observations of large waves that had passed between them the ripples carry with them implicit information about the obstructions. This behaviour is typical of other waves besides those on the surface of water, and waves that meet an object do not provide useful information about it unless their wave-lengths are comparable with, or smaller than the dimensions of the object. Ordinary light consists of waves whose wave-length is about one twenty-millionth of an inch, and there is thus a natural limit to the size of the smallest objects that can be examined with an ordinary microscope, no matter how well designed and constructed it may be. By using ultra-violet radiation (i.e. radiation of shorter wave-length than that of light of the visible spectrum) somewhat smaller objects can be observed, but the improvement is not great.

During the third decade of the present century it was found that electrons (and other material particles) possess many of the attributes of a wave motion, although in many respects they behave also as particles. The waves associated with them are peculiar in that their lengths depend upon the masses of the particles and upon their speeds, the wave-length decreasing as the speed increases. It is, moreover, a simple matter in the laboratory to accelerate electrons to such speeds that their waves are much shorter than those of light. If, therefore, it is possible to cause electrons to follow curved paths, in the same way as a beam of light is bent or refracted in passing from one medium to another, it should be possible to use electron waves in a microscope in the way light is used in an ordinary microscope, and at the same time avoid the limitations which the wave-length of light imposes. Electrons, however, are charged particles, so a beam of moving electrons can be refracted by an electrostatic or magnetic field, and if the field is of suitable shape and intensity it serves as an electron lens in the same way as a glass lens does with light waves. At the present time magnetic lenses are preferred to electrostatic for most purposes, but either can be used. The usual type of electron microscope works as follows. A beam of electrons is produced in a cathode ray tube and accelerated to a high speed by the use of a high voltage. The beam passes through a lens which concentrates it upon the

specimen whose thickness must be sufficiently small to permit most of the electrons to pass through without excessive scattering. The beam of electrons emerging from the specimen passes through a lens that acts as the objective lens of the microscope and produces a highly magnified image, and thence through a projection lens whose function is to form a further image on a photographic plate. After development this shows the structure of the object. Since collisions with air molecules would interfere with the paths of the electrons the E. M. must be evacuated. This is a disadvantage since it makes the apparatus more elaborate and makes it difficult to use specimens that are liable to damage during drying (e.g. biological material). The complexity and expensiveness of the apparatus are further disadvantages, but the E. M. is nevertheless a very useful instrument since it provides the means for examining objects far smaller than the smallest of those that can be seen in the best optical microscopes.

Electrophoresis. If solid particles, liquid drops, or gas bubbles are present in a liquid, and are so small that they settle out slowly or not at all, then, when electrodes are introduced into the liquid, a movement of the particles occurs, and they travel towards one or other of the electrodes. The direction and speed of motion depend upon the existence of electric charges at the surfaces of the particles, and hence upon the nature of the particles. The phenomenon is called E., and is used for the separation of particles or large molecules from others that are generally similar. A related phenomenon is that of electroosmosis. If electrodes are placed at each end of a tube containing liquid, and the tube has a porous plug of solid material somewhere within it, charging the electrodes causes liquid to flow through the plug towards one or other of the electrodes. On reversing the polarity of the electrodes the flow is reversed. Similarly, if the liquid is forced through the plug by mechanical pressure a difference of electrical potential is set up between electrodes placed in contact with the ends of the plug. This potential difference is called the streaming potential.

Electroosmosis, see **ELECTROPHORESIS**.
Electrophorus, see **Electricity—ELECTROSTATICS**.

Electro-plating and Electro-refining, see under **METALLURGY**.

Electroscope, Electrostatics and Electrostatic Voltmeters, see **Electricity—ELECTROSTATICS**.

Electro-technical Industries, see **ELECTRO-CHEMISTRY; METALLURGY**.

Electro-therapy. Static E. as developed by the Wimshurst machine, galvanic E. usually obtained from about forty Leclanché or bichromate cells yielding about sixty volts, and faradic E. as produced by a simple form of induction coil, are all used in the interests of medicine. Electricity may be used to produce physiological effects, as when it is applied to the skin, and when one electrode is applied to the spine and the other to a muscle. In the

first case the sensory surfaces are affected, a pricking and burning sensation being produced and the skin made red, showing increased vascularity. The second action is on the motor apparatus and causes the muscles to contract as the current is made and broken. During the First World War, and subsequently, sinusoidal currents were employed, rapid ones to stimulate relaxed muscles and slow sinusoidal current to restore paralysed muscles. Again, when a broad plate electrode is applied to any part of the body, and the other electrode, consisting of a platinum or steel needle, is inserted into a tumour (say), and a current measured in milli-amperes ($\frac{1}{1000}$ of an ampere, this being the unit used in E.) passed, an electrolytic effect will be obtained and the tissue will be decomposed. If the platinum electrode be positive the surrounding tissue will condense and contract round it; if it be negative then the tissue will break up into a loose frothy material. Some nervous and muscular diseases can be diagnosed with the aid of galvanic and faradic currents. Certain diseases of the spinal cord and the cerebro-spinal nerves alter the normal action of the muscles under the electric current. These abnormal effects are referred to as 'reactions of degeneration.' For the treatment of disease the three forms of current are used; the static for nervous disorders, e.g. neuralgia; the galvanic for acute neuralgia, atrophy of the muscles, diabetes, joints enlarged and stiffened by rheumatism, tonsillitis, etc., and the faradic for nervous exhaustion accompanied by insomnia, functional disorders of the generative organs, acute rheumatism, neurasthenia, and other diseases. By passing a suitable current between electrodes applied to appropriate parts of the body, a heating effect is produced, which may act as a sedative to pain, or may stimulate repair of broken-down tissues. Such diathermic treatment is used also for fibrosis of the limbs, empyema, and tuberculous bones.

Electrically produced rays, ultra-violet and X-rays are used separately and in conjunction. (See **CANCER, X-RAYS, ULTRA-VIOLET RAYS**.) The body itself produces electric currents, and those of the heart are utilised in the diagnosis of cardiac diseases. In conclusion it might be said that belts, rings, and all other contrivances which are advertised as having an electric or magnetic action, only cure in proportion to the faith of the wearer. They have no electrical effect, and if they had, the irregularity of their action and the lack of control of direction of the current would render them very uncertain. The so-called magnetic belts are worse than useless, since it is not known that even the most powerful magnets have any influence on the bodily functions. Electro-magnets are occasionally used to extract from tissues small pieces of steel, e.g. broken needle points. See H. H. U. Cross, *Electricity in Therapeutics*, 1936.

Electrotropism, a very poorly investigated subject dealing with the sensitiveness of plant organs to the action of electric

currents. If a plant be grown so that its roots dip into a liquid through which a current is passing, then some of the roots will incline to the anode and some to the cathode, thus showing the acquirement of polarity.

Electrotyping, see under METALLURGY; PRINTING.

Electrum has two meanings in antiquity: (1) A mixture of gold and silver; (2) amber. In the former sense it occurs in *Antigone*, where mention is made of Indian gold and the 'E. of Sardis,' as objects of the highest value. This is the native E., but it was also made artificially, and, according to Pliny, E. contained gold and silver in the proportion 4 : 1. It was used for plate and also for money, and coins are still in existence of this metal struck by the kings of Bosphorus, by Syracuse, and by other Gk. states.

Electuary (from a Gk. word signifying 'licking.' The term was also used by Lat. authors to designate a thick, honey-like substance). The word is used in medicine in Fr., but in Eng. is restricted to 'lentive E.,' a popular name for a compound confection of senna, an official preparation of the Brit. Pharmacopœia.

Elegit, see EXECUTION.

Elegy, general term in Gk. for any poem written in the elegiac metre, a combination of the dactylic hexameter and pentameter in a couplet. The word 'elegos' means a plaintive melody accompanied by the flute, and how it happened that the word was applied to elegiac poetry, the earliest representatives of which by no means confined it to mournful subjects, is doubtful. It may be that the term was only chosen in reference to the musical setting, the E. having originally been accompanied by the flute. The earliest representatives of the E., Callinus of Ephesus (c. 700 B.C.), and Tyrteus of Ephesus in Attica (c. 600), gave it a warlike and political direction, and so did Solon (640-559) in his earlier poems, and the E. of Theognis of Megara (c. 540), though erotic, are essentially political. The first typical representative of the erotic E. was Mimnermus of Colophon, a contemporary of Solon; and the E. of mourning or sorrow was brought to perfection by Simonides of Ceos (d. 469 B.C.). After this the emotional element predominated. Antimachus of Colophon (c. 400) gave the E. a learned tinge, and was thus the prototype of the elegiac poets of Alexandria, of whom Callimachus of Cyrene was the best. The subject of the Alexandrian E. is either the passion of love, or the learned narrative of fable and history, from which personal emotion is absent. This type was imitated at Rome towards the end of the republic, and the E. of Catullus are among the earliest attempts, later elegiac writers being Cornelius Gallus, Propertius, Tibullus, and Ovid, who, in his *Fasts*, showed how a learned subject could be treated in this metre. From this time onward the elegiac metre was constantly employed and was used for every possible subject, e.g. Rutilius Namantianus used it to describe his journey from Rome to France (418

A.D.). After the Renaissance the word E. was introduced into England, but was used to describe a funeral song or lament, the poem of Gascoigne's *The Complaint of Philomene* (1576) being among the first to receive the title. Later, however, the word was further restricted to its present meaning, e.g. a poem of regret pronounced at the obsequies of a particular person, and in this modern sense Spenser's *Daphnaida* is strictly an E., whereas Gray's celebrated poem, *An Elegy in a Country Churchyard*, belongs to a class apart, being not addressed to the memory of a particular person. Of the famous E. in English may be mentioned Milton's *Lycidas*, Shelley's *Adonais*, Matthew Arnold's *Thyrsis*, and Swinburne's *Ave atque Vale*. Tennyson's *In Memoriam* is generally excluded on the score of length, and Wordsworth's *Lucy* is a dirge.

Element is any substance which, as far as our knowledge extends, is composed entirely of atoms of identical or almost identical chemical properties (though not necessarily identical in structure—see ISOTOPES). In other words an E. is a substance which up to the present has not been split up into portions possessing different chemical properties. Es. used to be classified as metals and non-metals, and arsenic, boron, bromine, carbon, chlorine, fluorine, hydrogen, iodine, nitrogen, oxygen, phosphorus, selenium, silicon, sulphur, and tellurium; but this list was increased by the discovery of argon, helium, krypton, etc., and in any case, because of the merging of non-metals into metals by stages which make this classification difficult and arbitrary, the periodic system of Mendeleev, as modified in the light of modern knowledge of atomic structure, has been generally adopted (see CHEMISTRY). Most of the Es., except those of the argon group which are only found free, are usually found as compounds, although carbon, copper, gold, hydrogen, nitrogen, oxygen, silver, and sulphur are found in considerable quantities in their free state. The term E. could formerly be applied in only a tentative manner to any form of matter, because with the advance of science it was always possible that some substance once regarded as an E. might be found to consist of simpler forms, e.g. didymium was found to consist of neodymium and praseodymium. Chemical analysis is, however, now so precise that we feel confident in stating that there are altogether ninety-two elements, of which two only remain to be discovered. Following is a list of the Es. with their symbols and approximate atomic weights (q.v.):

Element.	Sym- bol.	Approx. At. Wt.	At. No.
Actinium .	. Ac	229	89
Aluminium .	. Al	27	13
Antimony .	. Sb	122	51
(stibium)			
Argon .	. A	40	18
Arsenic .	. As	75	33
Barium .	. Ba	137.5	56
Beryllium .	. Be	9	4
(glucium)			

Element.	Sym- bol.	Approx. At. Wt.	At. No.
Bismuth	Bi	209	83
Boron	B	11	5
Bromine	Br	80	35
Cadmium	Cd	112.5	48
Cæsium	Cs	133	55
Calcium	Ca	40	20
Carbon	C	12	6
Cerium	Ce	140	58
Chlorine	Cl	35.5	17
Chromium	Cr	52	24
Cobalt	Co	59	27
Copper (cuprum)	Cu	63.5	29
Dysprosium	Dy	162.5	66
Erbium	Er	167.5	68
Europium	Eu	152	63
Fluorine	F	19	9
Gadolinium	Gd	157	64
Gallium	Ga	69.5	31
Germanium	Ge	72.5	32
Gold (aurum)	Au	197	79
Hafnium	Ha	178.5	72
Hellum	He	4	2
Holmium	Ho	163.5	67
Hydrogen	H	1	1
Illinium	Il	146	61
Indium	In	115	49
Iodine	I	127	53
Iridium	Ir	193	77
Iron (ferrum)	Fe	56	26
Krypton	Kr	83	36
Lanthanum	La	139	57
Lead (plumbum)	Pb	207	82
Lithium	Li	7	3
Lutecium	Lu	175	71
Magnesium	Mg	24.3	12
Manganese	Mn	55	25
Masurium	Ma	98	43
Mercury	Hg	200.6	80
(hydrargyrum)			
Molybdenum	Mo	96	42
Neodymium	Nd	144.5	60
Neon	Ne	20	10
Nickel	Ni	58.7	28
Niobium	Nb	93	41
(columbium)			
Nitrogen	N	14	7
Osmium	Os	191	76
Oxygen	O	16	8
Palladium	Pd	106.5	46
Phosphorus	P	31	15
Platinum	Pt	195	78
Polonium	Po	210	84
Potassium	K	39	19
(Kalium)			
Praseodymium	Pr	141	59
Protoactinium	Pa	234	91
Radium	Ra	226	88
Radon (niton)	Rn	222	86
Rhenium	Re	187	75
Rhodium	Rh	103	45
Rubidium	Rb	85.5	37
Ruthenium	Ru	101.5	44
Samarium	Sm	150.5	62
Scandium	Sc	45	21
Selenium	Se	79	34
Silicon	Si	28	14
Silver (argentum)	Ag	108	47
Sodium (natrium)	Na	23	11
Strontium	Sr	87.5	38
Sulphur	S	32	16
Tantalum	Ta	181.5	73
Tellurium	Te	127.5	52
Terbium	Tb	159	65
Thallium	Tl	204.5	81

Element.	Sym- bol.	Approx. At. Wt.	At. No.
Thorium	Th	232	90
Thulium	Tm	169.5	69
Tin (stannum)	Sn	118.5	50
Titanium	Ti	48	22
Tungsten	W	184	74
(wolframium)			
Uranium	U	238	92
Vanadium	V	51	23
Xenon	Xe	130	54
Ytterbium	Yb	173.5	70
(neo-ytterbium)			
Yttrium	Y	89	39
Zinc	Zn	65.5	30
Zirconium	Zr	91	40

It should be noted that with the rapid advance of atomic science the possibility of making new Es. artificially has arisen. Thus plutonium, used in the Nagasaki and Bikini bombs, was made by bombarding atoms of uranium with neutrons (q.v.). Several other 'artificial' Es. are known (e.g. americium and curium) and their chemistry promises to be of great interest and importance.

Elemental Spirits, or Angels of the Elements, were imaginary beings who were supposed to preside over the four elements, the spirits of fire being called Salamanders, those of water, Undines, those of air, Sylphs, and those of earth, Gnomes. They were supposed to dwell in their respective elements, and the belief in their existence was a very popular one in the Middle Ages. Paracelsus wrote a treatise on them.

Elementary Education, see under EDUCATION.

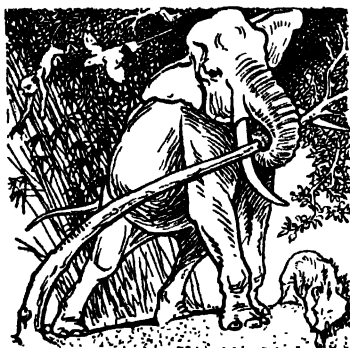
Elemi, oleo-resin obtained from the pitch-tree, a native of Manila. When pure it is pale yellow in colour and resembles honey in consistency. It has an aromatic odour and is soluble in alcohol and ether.

Elenchus (Gk. ελεγχος, commonly translated by the Lat. *argumentum*, *inquisitio*, *confutatio*, and *demonstratio*) a term frequently used in the Aristotelian system of logic to denote argument, replication, refutation, or the subject or nature of dispute, or demonstration. Aristotle himself defines E. as 'a syllogism of contradiction.' In the last two books of the *Organon*, he classifies and discusses the different kinds of sophistical elenchus, or modes of argument, used by sophists, e.g. the sophism designated *ignoratio elenchus*, or sinister deviation from the point under discussion, consists according to Aristotle, in proving something irrelevant.

Eleocharis, genus of cosmopolitan plants in the order Cyperaceæ. *E. valisneria* grows in marshy places, forming sometimes a large proportion of the peat in bogs; *E. tuberosa*, a native of E. Asia, has edible tubers.

Elephant (Lat. *elephantus*; Gk. ἐλέφαντος, ivory), a representative of the Proboscidea, a sub-order of ungulate mammals. There are two existing species of Elephants, the *Elephas maximus*, also called *Elephas indicus* or Indian E., and the *Elephas africanus* or African E. A number of extinct forms serve to connect

the E., to a limited extent, with other ungulates, but as the absolutely intermediate type has not been discovered, the origin of the *Elephantidae* is conjectural. The young Indian Es. are hairy, thus showing affinity with the mammoth. The most remarkable characteristic of the order, and the one from which they derive their title, is the long, flexible, prehensile proboscis, into which the nose is produced. This trunk, as it is called, is delicately sensitive. It has the nostrils at the extremity, and is used for the purpose of conveying food and water to the mouth. Es. have no canine teeth in either jaw,



ELEPHANT

and their tusks are developed only in the upper jaw; young Es. have a very minute pair of milk-tusks which are shed at an early age; the permanent tusks continue growing throughout life, and so remain open at their bases, which are enclosed in sheaths of the premaxillary bones, extending upwards in the skull as far as the nasal cavity. The tusks of young Es. are tipped with enamel, but this soon wears off and they then consist of ivory alone. The build of the E. is huge and bulky, the head being disproportionately large, the ears large and flapping, the neck very short and thick, and the limbs long and stout. The feet are short and broad, and have five toes each, of which the middle one is the largest. Es. are strictly herbivorous, subsisting chiefly upon roots, twigs, leaves, and young shoots. There is no authentication of the widespread belief that Es. may live for over 100 years. The oldest recorded age is sixty years. The *Elephas Indicus* is distinguished by its comparatively flat forehead and small ears, as well as by its smooth and nearly naked skin. The average height of the adult male does not exceed 9 ft., and that of the female 8 ft., but this is often considerably exceeded, and there is an enormous skeleton in the museum at Calcutta of an E. that lived about 1850-60, which measures 11 ft. 3 in. from the shoulders. The height of the Indian E. is almost pre-

cisely twice the circumference of its forefoot. Herds of Es. consist of from thirty to fifty individuals, all of which belong to a single family, a female being invariably the leader. They are fond of bathing and rolling in wet mud, and when heated they squirt water over their backs by means of the trunk. The *Elephas Africanus* differs chiefly from the Indian species in the enormous size of its ears, which, when in repose, completely cover the animal's shoulders. Its colour is a somewhat darker grey, and its disposition fiercer than that of the Asiatic tribe; also it is more rapid in its movements and has remarkable powers of getting over precipitous ground. Owing to persecution for the sake of its tusks, the African E. has grown much rarer, and is now only found S. of the Sahara, whereas formerly it was spread over the whole of the wooded districts. The white E. is a pure albino, and is sometimes found in Burma and Siam.

Elephanta Island (called by the natives Charapuri), small is. in Bombay harbour, about 5 m. from Bombay, India. It received its name from the Portuguese on account of a colossal statue of an elephant which once stood on the is., but is now in Bombay. It is celebrated for its cave temples, one of which contains a huge three-faced bust about 18 ft. high, representing Siva in his three-fold character of Creator, Preserver, and Destroyer. See J. Fergusson and J. Burgess, *The Cave Temples of India*, 1880; V. A. Smith, *A History of Fine Art in India and Ceylon*, 1911.

Elephantiasis, condition in which the legs become thickened and straight up and down like an elephant's. The disease also affects other parts, as E. of the scrotum. It is due to a blocking of the lymphatic glands and channels, combined with irritation of the skin, generally by an external contamination or inflammation. In the tropics, the blocking of the lymph channels is commonly due to a threadlike worm, known as *Filaria*, and its eggs. In cold climates the condition is rarely seen, but when it is, the blocking is due to various causes. The treatment consists in removing the irritation of the skin from any condition which may be present, by means of applications suitable for each individual case. The flow of lymph through the channels is aided by massage and elevation of the part.

Elephantine (the *Yeziret-ey-Taher*, or flowery isle, of the Arabs), beautiful is. in the Nile opposite Aswân. It was the prin. place of worship of Khnum or Khnoum, a ram-headed god, who enjoyed great repute as a creator, and was famous for its pottery, a peculiar pink ware with a brownish-pink face.

Elephant-seal, or Sea-Elephant, termed technically *Macrorhinus leoninus*, a carnivorous mammal, and is the largest of all the Pinnipedia.

Elephant's Foot, or *Tectudinaria elephantipes*, plant of the natural order Dioscoreaceae. It has a peculiar root-stock, with a rough and indented bark, shaped like an elephant's foot. It contains a great quantity of starch and was

used freely by the Hottentots for food; hence it is often called Hottentot's bread.

Elephant-shrew, name given to several insectivorous quadrupeds in the family Macroscelidae. They somewhat resemble the kangaroo-mice in appearance, and use their long hind-legs in similar fashion when they leap over the plains of Africa. The snout is so long that it looks like a proboscis, whence the name. *Macroscelides typicus* is a common specimen, and is called also the jumping-shrew or proboscis-rat.

Elephant's Tusk Shell, see DENTALIUM. **Elerts**, tn. of Orel Region of the R.S.F. S.R., 122 m. from Orel. It has a splendid position, and is important for its trade in corn and cattle and as a railway centre with foundries. E. was captured by the Gers. on Dec. 9, 1941, but was retaken by the Russians in the summer offensive of 1943. Pop. 45,000.

Eleteria, festival and mysteries, celebrated, originally only in Eleusis, in honour of Demeter and Persephone. They were regarded by the ancients as the most venerable and the holiest of all the mysteries celebrated in Greece, and were said to have been instituted by Demeter herself when wandering about in search of her daughter. At first the right of initiation was restricted to inhabitants of Attica, but later all Gks. were admitted and even the Romans, but all barbarians were excluded, as well as all who were guilty of murder. Those who wished to take part in the greater E. were first admitted to the lesser E., which were held every year in the month of Anthesterion, at Agræ on the Ilissus. They were then allowed as *mystæ* to take some part in the great E. the next autumn, but were not initiated into the greater mysteries until the next year. These were celebrated every year in the month of Boedromion during nine days, and on the second of these the *mystæ* were purified. The third was spent in fasting and sacrifice, and on the fourth the *Katathus kathodos*, a procession with a basket containing pomegranates and poppy seeds, took place. On the fifth day the *mystæ* went with torches to the temple of Demeter, where they remained all night, and on the sixth, the most solemn of all, a statue of Iacchus, son of Demeter, adorned with a garland of myrtle and bearing a torch in his hand, was carried along the sacred road amidst shouts and songs. During the night the *mystæ* were initiated into the last mysteries (*epopteia*), and confirmed their oath of secrecy, previously taken at the lesser E. On the seventh day the initiated (*epoptæ*) returned to Athens. The eighth day was an additional day for the convenience of those who arrived late, and the ninth day (*plemochœ*) was occupied by a libation, poured in the direction of E. and W. with mystical formula. The object of the E. was to excite and strengthen in the minds of the initiated by means of the story of Persephone, the faith in the continuance of life, and a system of rewards and punishments after death.

Eleusis, tn. and demus of Attica, 12 m. distant from Athens. It possessed a magnificent temple of Demeter, and it gave its name to the festival of the Eleusinia (*q.v.*). The tn. had been from time immemorial a seat of the worship of Demeter, but after its conquest, which took place, according to the story, under King Erechtheus, the Eleusinia became a festival common to both cities, though the superintendence of the festival remained with the descendants of Eumolpus, the king of E. Much damage was done to ancient monuments, especially Roman, remains, on the site during the Second World War.

Eleuthera, is. of the Bahamas, Brit. W. Indies, separated from Abaco by the Providence Channel. The soil is fertile, and pineapples, oranges, and lemons are cultivated. Chief tn., Governor's Harbour. The is. was colonized by a band of religious refugees from Bermuda, who sailed for the Bahamas in 1647 and settled on E., under the auspices of the Company of Eleutherian Adventurers—a body of Protestant Merchants and Members of Parliament. The Articles and Orders the Company drew up in London speaks of equality for all men, fair treatment for the natives, and the formation of a gov. and the calling of the 'small State-to-be' a 'Republic' with a Gk. name denoting its freedom. Although an Act of Parliament of 1649 confirmed the Eleutherian leader, Capt. Sayle, and his associates as proprietors, Charles II., twenty years later, ignored the Act, granting all the Bahamas to the duke of Albermarle and other lords, proprietors of Carolina. Area, 235 sq. m. Pop. 6400.

Eleutheropolis, see BETH JIBRIN.

Elevation, in astronomy, is the height above the horizon of an object on the celestial sphere, measured by the arc of a vertical circle passing through it and the horizon.

Elevators, see CONVEYORS AND ELEVATORS.

Elevators, Grain, see CONVEYORS AND ELEVATORS: HYDRAULIC MACHINERY; LIFTS.

Elf (O. E. *ælf*, *ylf*), a supernatural, diminutive being of early Teutonic lore. Efs. were believed to be tricky sprites, much given to interference in human affairs. They stole children and placed changelings in their stead, they visited people in their sleep and gave them nightmares, and sometimes inflicted them with diseases, and with their elf-bolts they struck down human beings and cattle alike. They also elf-locked women's hair, i.e. they tangled it into a matted mass, which it was considered unlucky to undo. Efs. were dwarfish and generally black in appearance. See also FAIRIES. See T. Keightley, *Fairy Mythology*, 1828; S. Nilsson, *Primitive Inhabitants of Scandinavia*, 1863; W. Sikes, *British Goblins*, 1880; J. Rhys, *Celtic Folklore*, 1901; O. H. Dunne-Jones, *Book of Fairies*, 1933.

El Fasher, cap. of Darfur, Anglo-Egyptian Sudan, and centre of the caravan routes across N.E. Africa. Pop. about 15,000.

El Ferrol, see FERROL.

Elgar, Sir Edward William, Bart. (1857-1934), Brit. composer. Practically self-taught, both as conductor, executant, and composer, E. spent his early years at teaching and similar drudgery. His music is deeply imbued with the mysticism, not only of Christianity (he was a Rom. Catholic), but also of paganism, as is realised, for instance, in *King Olaf*. E. devoted most of his attention to choral writing, and, besides *Olaf*, produced *The Kingdom*, *Caractacus*, and others, the best being his setting of Newman's *Dream of Gerontius* (1900). This is one of the finest works in Brit. choral music, yet was at

and again in his scores. His orchestration, especially for strings, is superb, and his harmony original and strongly chromatic. His two military marches, *Pomp and Circumstance* and the *Coronation Ode*, were inspired by the coronation of King Edward VII.; the tune *Land of Hope and Glory*, which occurs in both, has long been so popular in Great Britain as to be ranked next to *God Save the King* as a national song. His highly individual art, as exemplified in the tone poem *Falstaff*, 1913, was well sustained in his *Spirit of England* and *For the Fallen*, both composed in 1916 during the dark days of the First World War. Even if his chamber music, produced after that war, does not reveal him at his best, he is the most widely known of all Eng. composers. In 1924 he conducted the massed choirs and bands at the Royal opening of the Brit. Empire exhibition at Wembley when his Imperial March and *Land of Hope and Glory* were rendered before the King and a vast audience. He was appointed Master of the King's Music in 1924, and, in the year of his death, was president of the Hallé Concerts Society. He received the O.M. in 1911, and a baronetcy in 1931. See R. J. Buckley, *Sir Edward Elgar*, 1912; J. F. Porte, *Sir Edward Elgar*, 1921; W. H. Reed, *Elgar* (Master Musicians), 1939; E. Blom, *Everyman's Dictionary of Music*, 1916.

El Ghor, the Arabic name for the great depression extending from the sea of Galilee to the Dead Sea, Palestine. Length 65 m., breadth 6 to 12 m.

Elgin, co. of Scotland, see MORAY.

Elgin, cap. of Morayshire, royal and parl. bor. of Scotland, on the R. Lossie. There are ruins of the fine cathedral, 'Lantern of the North,' founded 1224 (burnt 1390, rebuilt later), in the form of a cross, also of the chapter-house and Grey Friars' monastery. The ruined palace of the bishops of Moray is 2 m. N., on Loch Spynie, and 6 m. S.W. is the Cistercian Pluscardine Priory (1230), restored by Lord Bute. There are brewing and woollen industries, saw-mills and sandstone quarries. Pop. 8,800.

Elgin, city of Kane and Cook counties, Illinois, U.S.A., on Fox R., 35 m. from Chicago. It manufactures watches, butter, pipe organs, silverware and condensed milk, and is the seat of two academies, Elgin and St. Mary's, and of the N. Illinois Hospital for the Insane, with 1800 patients, and has a library with 60,000 vols. Pop. 38,000.

Elgin, Earls of. The first earl, whose family was by descent connected with King Robert I. of Scotland, was given his earldom by Charles I. in 1633. He was succeeded in 1663 by Robert Bruce, who was created earl of Allesbury in 1664, and became lord chamberlain in 1687. Thomas Bruce, the third earl (c. 1655-1741), was a courtier of James II., and, for refusing to take the oath of allegiance to William and Mary, was under suspicion. He was imprisoned as a Jacobite conspirator (1690-98), but was allowed to flee to Brussels in 1696. The ninth earl of Kin-cardine (1732-71) succeeded as fifth earl



Herbert Lambert

SIR EDWARD ELGAR

first received with indifference, but since its eulogism by Richard Strauss it has become widely popular. In *The Apostles*, (1903) and *The Music Makers* (1912), E. carried his ideas to a point of originality beyond anything else he previously composed. His orchestral works include the beautiful overture, *In the South*, the fine *Enigma* variations (1899), and the offspring of this latter work, the two symphonies (1908 and 1911), both worthy to rank with the classic symphonies, the *Introduction and Allegro* for strings (1905), the great violin concerto, popularised by Kreisler, and the cello concerto (1919) which Casals ranks among the few masterpieces in this medium. E.'s songs, chamber-music, and smaller works are often poetic, but add nothing to a reputation founded on *Gerontius*, and the *Ab* Symphony. On the whole, the character of his music is deeply psychological and yet broad, *nobilmente*, as he directs again

of E. in 1747. Thomas Bruce, the seventh earl of E. (1760-1841), sold to the nation, in 1816, the collection of sculptures known as the 'Elgin Marbles' (*q.v.*). He was a soldier and diplomatist, and was Brit. envoy to the Porte (1799-1803), where he gathered together his collection.

His son, James Bruce, the eighth earl (1811-63), was also a diplomatist. He displayed great ability as governor of Jamaica (1842-46) and of Canada (1847-54). In 1857 he was sent as an envoy to the Far E., where he concluded the treaty of Tientsin with China (1858), and, on the Chinese refusing to ratify it, he captured Peking (1860). He was appointed viceroy of India in 1862. Victor Alexander Bruce, the ninth earl, was born near Montreal in 1849. He became treasurer of the Household and first commissioner of public works during Gladstone's administration (1886), and viceroy of India (1894-99). He was chairman of the commission of the Scottish Church case (1904), and was appointed by Campbell-Bannerman secretary for the colonies (1905-8). See *Letters and Journals* of the eighth earl, 1872; and his life by Bourinot, 1903, and G. Wrong, 1905.

Elgin Marbles, famous collection of anct. Gk. sculptures, brought to England (c. 1812) through 'the agency of the seventh earl of Elgin, after whom they are named, and acquired for the Brit. Museum in 1816 for £35,000. They are portions from the frieze of the Parthenon (designed by Phidias) and other buildings on the Athenian Acropolis. Elgin's act was denounced as 'vandalism,' but if left these treasures would probably have been destroyed by the Turks who were using the Parthenon for target practice. The vessel in which Lord Elgin shipped 250 ft. of the frieze (originally 524 ft. in length) was shipwrecked and Elgin had to pay 274,000 for their recovery.

Elgon, or **Ligonyi**, Mount, extinct volcano, 14,140 ft. high, of Uganda, Brit. E. Africa, 60 m. N.E. of Lake Victoria.

Eli (Heb., elevation), Israelite priest who was also one of the Judges. He was the son of Aaron and of the family of Ithamar. His name chiefly enters the Biblical narrative in connection with the story of Samuel.

Eliakim, see JEREMIAH.

Eliaas, Mount St., see ST. ELIAS, MOUNT.

Elle, small watering-place of S.E. Fife-shire, Scotland, in the frith of Forth. It has golf-links. Pop. (with Earlsferry), 1000.

Elgius, see ELIOT.

Elijah (N.T., Elias), greatest and most picturesque of the prophets of Israel, lived during the reigns of Ahab and Ahaziah. His life was chiefly spent in opposing the worship of Baal, which the former king was encouraging. The story of his life and acts is fully told in 1 Kings xvii.-xix. and xxi., 2 Kings i. and ii., 2 Chron. xxi., 12-15. Like Enoch he was translated to heaven instead of dying a natural death, and for long there remained a tradition among the Jews that he would again come to Israel before the advent of

the Messiah. This expectation, expressed in Mal. iv. 5, Jesus declares to have been fulfilled in the preaching of John the Baptist. In the N.T., Elias is also mentioned as appearing with Moses on the Mount of Transfiguration. The festival of E. is celebrated by the Gk. and Rom. Churches on July 20. In Greece he is regarded as the patron saint of mts., and among Rom. Catholics legend once described him as founder of the Carmelite order. The Russians have many legends about the Jewish prophet, chiefly derived from the anct. tales of Perun, their thunder-god. See W. Milligan, *Elijah, his Life and Times*, 1887; T. K. Cheyne, *The Hallowing of Criticism: Nine Sermons on Elijah*, 1888; A. Blunt, *The Prophets of Israel*, 1929; H. L. Taylor, *Elija and Elisha*, 1931.

Elimination, in algebra, is a process of solving systems of equations which consists in getting rid of a quantity or letter which is common to the equations, by forming another that does not contain that letter. For example, given

(1) $x^2 + y^2 = 1$ Eliminate y , i.e. deduce
(2) $x + y = 1$

an equation involving x only.

Equation (2) is equivalent to

$$y = 1 - x$$

∴ Equation (1) is equivalent to

$$x^2 + (1 - x)^2 = 1$$

$$\text{i.e., } 2x^2 - 2x = 0$$

$$\text{i.e., } x^2 - x = 0$$

which is an equation in x only, ∴ y has been eliminated.

Eliot, Charles William (1834-1926), Amer. univ. president and educationalist, b. in Boston, Massachusetts. He was the son of a former mayor of Boston, who had also been treasurer of Harvard Univ. As a matter of course, the son went to Harvard, from which he graduated in 1853. After a period of study abroad, he returned to his country to become prof. of chemistry in the Massachusetts Institute of Technology from 1865 to 1869. Later, he was elected President of Harvard Univ. in 1869, and held this great position for forty years, after which he was president emeritus until his death. In the country at large he was a motive force in improving primary and secondary schools. In religion he became known as one of the greatest spokesmen for the Unitarian faith. He was an active supporter of President Woodrow Wilson, who offered him the embassy to England, which, however, he declined. His mind marched with Wilson's on the great subjects of disarmament and the League of Nations. Among his works are *Four American Leaders* (1906), *The Road Toward Peace* (1915), and *A Late Harvest* (1924).

Eliot, George, was the pseudonym taken by Marian Evans (1819-80), the youngest child of Robert Evans, land-agent to the Newdigate family, by his second wife. She was born on Nov. 22, and the best authority for her early life is the easily-discernible autobiographical portions of her novels. Therein many of the characteristics of her father are reproduced in Adam Bede and Caleb Garth, her brother

Isaac figures as Tom Tulliver, and herself is introduced as Maggie Tulliver. Marian Evans was brought up to the strict observances of religion, and possibly influenced by an aunt who was a Methodist preacher, she inclined to evangelicalism. In these days she was most austere, theatres were to her something almost unholy, and her favourite reading was Thomas à Kempis and Bunyan, Young and Whiston, *Rasselas*, and *The Lives of the Poets*. When Marian was twenty-two, her father moved from Arbury Park to Coventry, and she went with him. Here began the second phase of her life. She made the acquaintance of Charles Bray (1811-84), the author of *The Philosophy of Necessity* and other works, and of Mrs.



GEORGE ELIOT

N.P.G.

The portrait by Sir Frederick Burton, 1865

Bray, whose brother, Charles Hennell (1809-50), had written *An Inquiry concerning the Origin of Christianity* (1838). In such company, for Bray, as well as his brother-in-law, was a freethinker, Marian Evans began to doubt, and at last to allow her doubts entirely to conquer her. In 1844 when Miss Brabant (afterwards Mrs. Charles Hennell) had to resign the task of trans. Strauss's *Leben Jesu*, she it was who brought it to a successful conclusion. This was pub. in 1846, but Miss Evans's name did not appear. Robert Evans, who had been greatly distressed by the change in his daughter's religious convictions, died in the spring of 1849, and then, after a short Continental tour with the Brays, she for a while made her home with these devoted friends. In 1851 she was offered the assistant-editorship of the *Westminster Review*, and she filled this laborious post for some years,

from time to time contributing to its pages articles and elaborate reviews. This work, which necessitated her living in London, occupied most of her day, but she contrived to find time to translate Fauerbach's *Essence of Christianity*, which was pub. in 1854, the only book to appear over her own name. The third phase of the life of Marian Evans—the 'George Eliot' period—dates from 1853, the beginning of her acquaintance with George Henry Lewes (1817-78), the author of the *Life of Goethe* and the *Biographical History of Philosophy*. In the following year they decided to live together, though they could not get married, because Lewes had a wife living, from whom, however, he was separated. It was not with light hearts that they took this step, but having taken it, they regarded the union as being as binding and as legitimate as if it had had the sanction of the law and the church, and it endured until the death of Lewes twenty-four years later. Miss Evans continued to contribute to the *Westminster Review*, and she wrote many reviews for the *Leader*, of which paper Lewes was editor. Lewes was a great believer in the genius of Miss Evans, and in 1856 he persuaded her to see if her gifts lay in the direction of fiction. She made an attempt, and Lewes, without divulging the name of the writer, sent it to Blackwood, who at once accepted it for his magazine. This was *Amos Barton*, and it was followed by *Mr. Gilfil's Love Story* and *Jane's Repentance*. These stories were collected in 1858 as *Scenes of Clerical Life*, and were received with enthusiasm in literary circles. Dickens was especially appreciative, and he alone among the critics discerned the sex of the author. Encouraged by the success of these short stories, Miss Evans began a full-dress novel, *Adam Bede*, which was finished thirteen months later, and pub. on Feb. 1, 1859. The qualities that marked *Scenes of Clerical Life* were present in *Adam Bede*, which evoked a further chorus of praise and placed George E. in the front rank of contemporary novelists. *Adam Bede* was followed by *The Mill on the Floss* (1860), which is generally regarded as her masterpiece. The earlier part, which is largely a transcript from life of the youth of herself and her brother, is one of the most beautiful things in Eng. fiction; but taken as a whole the novel gives undue prominence to the childish scenes, a fault the author, in reply to a criticism of Bulwer Lytton, regretfully acknowledged. *Silas Marner* appeared in 1861; and then George E., accompanied by Lewes, went to Florence to get material for a projected hist. novel of the time of Savonarola. While Thackeray was editor of the *Cornhill Magazine*, Smith, Elder & Co. offered her the hitherto unprecedented sum of £10,000 for the serial and book rights of the new novel, *Romola*, and eventually she accepted £700, for its appearance in the *Cornhill*. The first instalment was printed in the magazine in July 1862, the last in Aug. of the following year, the story being written from month to month, the last words not being written until June

1863. The author said that she 'began it a young woman, she finished it an old woman,' and certainly the amount of reading that she did in connection with it was enormous. George E. had said of *Esmond* that there was too much hist. and too little story. Of *Romola* it may be said that not only was the hist. of the period 'got up' for the purpose of writing the novel but that the information she had acquired most disastrously overweighted the book. *Felix Holt* appeared in 1866, *The Spanish Gypsy*, a Poem, two years later, and in 1871-72 was pub. *Middlemarch*. In spite of the over-elaboration of plot and language, *Middlemarch* will for ever be valuable as a picture of contemporary prov. life, and for the many characters that adorn its vast canvas, although it is disfigured by the exaggeration with which Casaubon is portrayed. This book at the time raised the reputation of George E. to the greatest height. The novel *Daniel Deronda* (1876), and *Theophrastus Such* (1878), though successful, did nothing to enhance her fame. Lewes died in the winter of 1878, and George E. lost in him husband, friend, and literary adviser, though it may be doubted whether in this last capacity his influence was entirely for good. She bitterly lamented his loss, and shut herself up from all society for some months. In April 1880, she, to the general surprise, being then in her sixty-first year, married John Walter Cross, whom she had known for many years. She died on Dec. 22 in that year. George E. is one of the great names in the annals of Victorian fiction. Her pictures of lower middle-class life in the Midlands are unsurpassed, and when, as in her earlier novels, she is not unduly didactic, her merits as a painter of character are great. *Adam Bede*, *The Mill on the Floss*, and *Middlemarch* show her at her best, and so good are each of these that critics are undecided as to which is her masterpiece. See lives by J. W. Cross (her husband), 1885; O. Browning, 1888; Sir L. Stephen, 1902; E. S. Haldane, 1927; J. L. May, 1930; Blanche C. Williams, 1936; S. Dewes, 1939; G. Bullett, 1947.

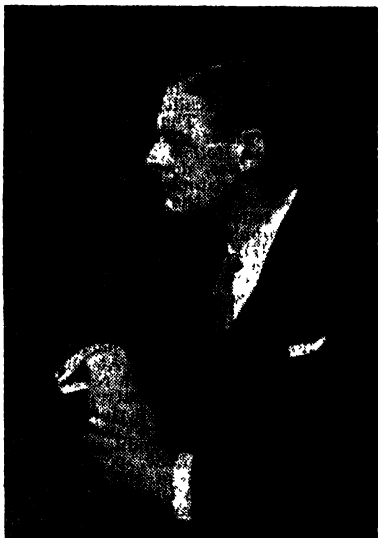
Eliot, Sir John (c. 1590-1632), Eng. statesman, an eloquent debater, and leader of the popular party. He led the Opposition in the Parliament of 1626, denounced Buckingham, and was imprisoned for a time. In the third Parliament (1628-29), he helped to draw up the Petition of Right, thus again offending Charles I., who dissolved Parliament and imprisoned E. and others. His *Monarchie of Man* (written in the Tower) was not pub. till 1879-82 with other works of his. See life by J. Foster, 1864.

Eliot, John (1604-90), Eng. missionary to the Indians of Massachusetts, known as 'the apostle of the Indians.' He attempted to organise the nomadic tribes into a great Christian community, and was minister of Roxbury church, near Boston, U.S.A. E. trans. the Bible into the Indian languages (1661-63), wrote an Indian catechism (1653), and grammar (1666); *The Christian Commonwealth*

(1659); and *Harmony of the Gospels* (1678). See W. L. Walker, *Ten New England Leaders*, 1901.

Eliot, Sir Thomas, see ELYOT.

Eliot, Thomas Stearns, Eng. poet and critic of Amer. origin, b. at St. Louis, Missouri, on Sept. 26, 1888, the son of Henry Ware E. (1841-1919), whose father, a Unitarian minister, had come to live in St. Louis in 1834. Before that the family had been estab. in Boston since emigrating from England in the seventeenth century. E. graduated at Harvard in 1909, spent a year at the Sorbonne, and returned to Harvard to study literature and philosophy. In 1913 he was given an academic



Press Portrait, Bureau
T. S. ELIOT

appointment there and the following year gained a travelling fellowship, which took him to Germany. He also read philosophy at Merton College, Oxford. He married in 1915 and made his home in England. He was for a short time a schoolmaster, then worked in a bank, and in 1917 became assistant editor of the periodical *The Egoist*. This was followed by his editorship of *The Criterion*, later *The New Criterion*, which for more than ten years was one of the foremost literary periodicals in London. Since 1925 he has been a director of the publishing firm of Faber and Gwyer, later Faber and Faber. E. had begun writing poetry at an early age, being influenced strongly by the French Symbolist poets, particularly Jules Laforgue (q.v.). His first poem to be printed was *The Love Song of J. Alfred Prufrock*, which appeared in the magazine

Poetry in 1915. This and other early pieces were pub. in *Prufrock and Other Observations* (1917), followed by *Poems* (1919), and *Ara Vos Prec* (1919). A collected vol. appeared in 1920. These poems show exact and humorous observation. They are also a criticism of contemporary urban life dramatically portrayed through a number of satiric characters. The climax of this phase of apparent disillusionment was reached with the pub. of *The Waste Land* in 1922. This widely celebrated poem, which won the Dial Award of 2000 dollars, applied to modern life the anct. fertility myths studied in Miss Jesse Weston's book, *From Ritual to Romance*, to which E. acknowledged his indebtedness. The modern world is one in which faith is lost and which is therefore incapable of rebirth. Great erudition, fused in poetic inspiration, is employed in the juxtaposition of vivid images by which are thrown into relief the characteristics of the reality which the poet seeks to express. The mood in which satire was stronger than sympathy continued in *The Hollow Men* (1925) and *Sweeney Agonistes*, described as 'Fragments of an Aristophanic Melodrama', which appeared in the *Criterion* in 1926. Thereafter followed three short poems pub. in pamphlet form, *The Journey of the Magi* (1927), *A Song for Simeon* (1928), and *Animula* (1929). E. increasingly devoted himself to the study of good and evil, and the way of escape from the 'waste land' through humility and faith. This found magnificent expression in *Ash Wednesday* (1930), a poem of profound religious intensity. At this time poetic drama was enjoying a revival with the work of the Group Theatre, by which *Sweeney Agonistes* was performed. E., however, gained a closer association with the stage during the production of his pageant play, *The Rock*, performed at Sadlers Wells in aid of the Forty-Five Churches Fund in the Diocese of London. The choruses, which are fine declamatory poetry, were later printed in the *Collected Poems 1909-1935* (1936). From this E. proceeded to his first full-length play, *Murder in the Cathedral*, an historical tragedy on the murder of Thomas-a-Becket. It was first performed in 1935 in Canterbury and London, and was a marked success. Apart from revivals on the English stage it has since had notable productions in France (1945) and Germany (1946). E.'s next play *Family Reunion* was produced in 1939. Its theme is inherited sin and redemption through renunciation. Its theme and the power of the verse are perhaps more than the characterisation and setting can convincingly carry. E.'s early poems, which marked a new direction away from nineteenth-century romanticism, affected the whole course of poetry since their appearance. They were as celebrated for their influence as their achievement. The reputation which challenged critical opinion in the 'twenties has been consolidated and enhanced by the work of the succeeding decade. *The Four Quartets*, which were first pub. collectively with

that title in 1944, have been described as 'the record of four pilgrimages whose purpose is the rediscovery of and reconciliation with the past.' Each of the four poems has for its title the name of the locality with which the poet's meditations are associated: *Burnt Norton*—included in *Collected Poems* in 1936—the name of a deserted house and garden in Gloucestershire; *East Coker* (1940), a Somerset vil. where E.'s forefathers once lived; *Dry Salvages* (1941), a cape of the Amer. coast; *Little Gidding* (1942), a vil. in Huntingdonshire where Nicholas Ferrar (q.v.) once set up a religious community. In criticism E., himself a critic of dogmatic clarity, is at the head of one trend of thought distinguished by the name classical, being concerned with estab. objective standards. His critical writings, which within their range have amounted to a complete revaluation of poetry, are contained in *The Sacred Wood* (1920), *Homage to John Dryden* (1924), *For Lancelot Andrewes* (1928), *Dante* (1929), *Tradition and Experiment in Present Day Poetry* (1929), *Elizabethan Essays* (1934), *Essays Ancient and Modern* (1936), *What is a Classic* (1945), and *Notes towards the Definition of Culture* (1948). In 1932 E. returned to the U.S.A. to take up the appointment of Charles Eliot Norton Professorship of Poetry at Harvard, 1932-33. A course of lectures delivered at the University of Virginia in 1933 was pub. the following year with the title *After Strange Gods, A Primer of Modern Heresy*. His Henriette Hertz lecture on Milton was pub. in 1947. As a churchman his *Idea of a Christian Society* (1939) is a notable plea for a Christian community founded on a national Church. His sociological writings also include *Notes towards a Definition of Culture* (1948). E. became a naturalised Brit. subject in 1927; awarded the O.M., 1948. Degrees include Hon. Litt. D. at Cambridge, Harvard, Yale, Princeton, Bristol, and Leeds, and LL.D. at Edinburgh. In recognition of his 'remarkable pioneering work in modern poetry' he was awarded the Nobel Prize for literature, 1948. See H. R. Williamson, *The Poetry of T. S. Eliot*, 1932; F. O. Matthiessen, *The Achievement of T. S. Eliot*, 1935; E. M. Stephenson, *T. S. Eliot and the Lay Reader*, 1944; R. Preston, *Four Quartets Rehearsed*, 1946; B. Rajan (ed.), *T. S. Eliot, A Study of his Writings by Several Hands*, 1947; and T. S. Eliot: *A Symposium*, 1948.

Elliott, George Augustus, see HEATHFIELD, BARON.

Elios, or Elea, in anct. Greece an important region of W. Peloponnesus, containing the Olympian valley and watered by the Alpheus and Peneus. It lay between Achaia and Messenia, stretching from Aracus and the R. Larissus (N.) to the R. Neda (S.), and bounded on the W. and E. by the Ionian Sea and Arcadian Mts. It was later incorporated in the Rom. prov. of Achaia. The modern Paleopolis occupies the site of the tn. of E. Since 1899 a prefecture of Greece, with Pyrgos as the cap. Pop. 148,500.

Elisabethville, tn., cap. of the Katanga Prov., Belgian Congo, Africa. Founded in 1910. Is 946 m. from Bulawayo, and 1619 m. from Beira. It has a theatre, park, hospital, public library, an agric. exhibition, and two daily newspapers. Many notable buildings have been erected, including a Rom. Catholic Cathedral; 8 m. away is The Star of the Congo Mine. The smelters of the Union Minière du Haut-Katanga, railway sidings and native compounds, etc., are in the suburb of Lumbumbashi. Malaria has been considerably reduced here and in other townships of the Belgian Congo and the sanitary services of E., especially, are highly organised. Pop. (white) 2700.

Elisha (N.T., *Eliseus*), son of Shaphat and successor of Elijah, was a great prophet of Israel. He lived during the reigns of Jehoram, Jehu, Jehoahaz, and Jehoash, exercising his ministry over a total period of nearly sixty years. As compared with his predecessor, whose faithful attendant he was, E. shows a mild and beneficent temperament instead of Elijah's fire and austerity. This comparison is fully brought out by a study of their miracles. His story is chiefly told in 2 Kings ii.-ix. E.'s festival is celebrated in the Gk. Church on June 14.

Elista, or **Yelista**, *see* STEPNOI.

Elixir, from the Arabic *al-iksir* and ultimately from the Gk. *ἐλεῖος* (a drying powder), is primarily an alchemical term for a supposed agent capable of transforming base metals into gold or silver and of prolonging human life indefinitely. It is therefore approximately equivalent to the philosopher's stone. There were two main Elixirs, viz. the Great Red E. and the White E. The latter turned mercury, etc., into silver, while the former turned silver or any other metal into gold. (See ALCHEMY.) The term E. is also applied to a drug of syrupy consistency intended to be slowly swallowed to lubricate the throat in cases of cough and irritation. Another meaning of E. is a medicated flavoured syrup.

Elizabethgrad, *see* KIROVO.

Elizabeth: (1) Cap. of Union co., New Jersey, U.S.A., 5 m. from Newark, on the Elizabeth R., Newark Bay, and Staten Is. Sound (Elizabethport), forming a residential suburb of New York. There are factories of chemicals, electrical machinery, the Singer Sewing Machine Co., ship-building yards, iron-foundries and railway machine-shops. Settled in 1664 as 'Elizabethtown,' the place has many historical buildings. Pop. 109,900. (2) Cap. of Pasquotank co., North Carolina, U.S.A., on the Pasquotank R., 40 m. from Norfolk, Virginia. It has a fine, deep harbour, cotton-mills, and shipyard. The first General Assembly of Virginia met here in 1665. Pop. 11,500.

Elizabeth (1533-1603), queen of England, daughter of Henry VIII. and Anne Boleyn, b. in Greenwich Palace on Sept. 7. After her father's marriage with Jane Seymour, E. and her half-sister Mary were declared illegitimate. Her early childhood was spent under a cloud, as was the greater part of her life until her acces-

sion. She was splendidly educated, her tutors had been steeped in the New Learning, and the future queen had the full benefit of this. The influence of the Reformation had by this time been fully felt in England, and the princess was brought under this influence also. During the reign of her half-brother Edward VI. she fell under the influence of Lord Seymour, lord high admiral of England, for whom she seems to have entertained some affection. He was, however, held to be only exercising his influence for the purpose of attaining his ambition, and was subsequently executed. During Mary's reign, although she had supported



N.P.G.

QUEEN ELIZABETH

Painting: artist unknown

the claims of her half-sister in preference to those put forward by Northumberland in favour of Lady Jane Grey, she fell under suspicion. She was accused of complicity in the rising of Sir Thomas Wyatt and was imprisoned in the Tower and later at Woodstock. In 1558 she succeeded to the throne of England without any open opposition. Diplomatic compromise may be taken as the keystone of her reign. She had been educated as a Catholic, but had imbibed Protestant doctrines, the result being that her religious convictions were somewhat shadowy. She, however, was responsible for the estab. of the Church of England on a basis which she hoped would be acceptable to all, Catholic and Protestant alike, the Thirty-nine Articles and the Book of Common Prayer as we have them at the present time being products of her reign. She, however, became a Protestant, not from religious convictions, but because it

was necessary for the salvation of England and the increase of Eng. power that she should be recognised as the Protestant champion of Europe. It is necessary to view the acts of Queen Elizabeth from two standpoints. First, as a queen and therefore the head of the Eng. nation, and secondly as a woman. In her former capacity, 'the days of good Queen Bess' amply describe the hist. of the time. By sheer diplomacy she and her ministers steered the ship of state through difficult times. She kept England nominally at peace until it was absolutely essential to strike, and when she struck, she struck with the whole force of a united England behind her. She played off her opponents skilfully one against the other, and in this way saved England from disaster. She kept the peace with Spain and yet at the same time encouraged the attacks made by the privateers of the W. upon the Span. power in America. When the Armada came it cannot be said that England was prepared, save that every Englishman was prepared to face united the efforts of Spain, and the speech of the queen at Tilbury, made when England was face to face with the greatest of her dangers, mirrored the opinion of England excellently. As a queen E. can only be described as popular, brave, courageous, and diplomatic, and perhaps her true greatness lies essentially in the fact that in her and through her England found her own aims and ideals most amply and excellently expressed. She owed her great power and popularity also to the fact that she was able to read the mind of the nation. She had great energy, industry, and physical strength, all essential Tudor qualities. From her mother she inherited great physical attractions, but also a coarseness and boldness which detracted not a little from her physical charms. Her qualities as woman and queen are illustrated by the way in which she made the gift of her hand the centre of the diplomacy of her earlier years. At home her two greatest romances were with the earl of Leicester and later with the earl of Essex. Her great passion was, however, for the former. She was inordinately vain, and was also cruel and capricious. Able to make up her mind and to act upon it with a suddenness that confounded her enemies, she also at times seems to have experienced the greatest difficulty in arriving at a decision, as witness her treatment of her cousin, Mary Queen of Scots. Both as a woman and queen she was only too obviously insincere, and the masculinity of her characteristics detracted greatly from what feminine charms she had. The 'Virgin Queen' passed away at Richmond on March 24. Her reign had seen a great revival in England on practically every side, socially, politically, and in the realm of learning. The Eng. Renaissance came in her reign. Shakespeare, Spenser, Marlowe, Jonson, were all writers during her time, and her reign may be called the golden age of Eng. literature. The revival was experienced not only in letters, but the exploits of the 'pirates of the West' reflect glory not

only upon the reign of E., but also on the hist. of England for ever. The queen herself was despotic, as had been all the Tudors, but her despotism was based upon the only foundation on which it could be successful, the trust of her subjects. See Agnes Strickland, 'Queen Elizabeth' in *Lives of the Queens of England, 1840-48*; J. A. Froude, *History of the Reign of Queen Elizabeth, 1856-70*; F. Munby, *The Girlhood of Queen Elizabeth, 1909*; M. Creighton, *The Age of Elizabeth, 1925*; Edith Sitwell, *Fanshawe for Elizabeth, 1946*.

Elizabeth (1596-1662), Queen of Bohemia, wife of Frederick V., Elector Palatine, and daughter of James I. of Great Britain and Anne of Denmark, b. at Falkland Castle, Fifeshire. From 1603 till her marriage in 1613 she was brought up in England. In 1610 Frederick was chosen to fill the throne of Bohemia, and from that time onwards Elizabeth's life was dogged by misfortune. The king was routed by the Catholic League and the royal family endured sore poverty in Holland. She had thirteen children, among whom were Charles Louis, restored to the electorate in 1648, and Sophia, who afterwards became the mother of George I. of England. See R. S. Rait (ed.), *Five Stuart Princesses, 1902*.

Elizabeth, Angela Marguerite (b. 1900) queen of George VI. of England; youngest daughter of Sir Claude George Bowes-Lyon, fourteenth earl of Strathmore and Kinghorne, by his countess, Nina Cecilia, daughter of Rev. Charles Cavendish-Bentinck, a son of the third duke of Portland. Born Aug. 4, 1900. She married April 26, 1923, Prince Albert Frederick Arthur George, duke of York: of which union there is issue—Princess Elizabeth Alexandra Mary, Duchess of Edinburgh, born April 21, 1926; Princess Margaret Rose, born Aug. 21, 1930. She became queen when Prince Albert succeeded to the throne as George VI. on Dec. 11, 1936; and went with the king on a tour of Canada and the U.S.A. in June, 1939, the visit being an unqualified success. She broadcast to women of the Empire, April 11, 1943. Queen Elizabeth is the first and only woman bencher of the Middle Temple Inn of Court—in which capacity she opened the temporary library, Nov. 21, 1946. In 1947 she accompanied the king on a tour of S. Africa.

Elizabeth (Pauline Elizabeth Ottilie Louise) (1843-1916), known under the pseudonym of Carmen Sylva in the literary world, b. at Neuwied, Germany, daughter of Prince Hermann of Wied and Princess Maria of Nassau. Married Prince Charles of Rumania in 1869, having previously travelled for five years. In 1881 Rumania was declared a kingdom, and the same year E. was crowned queen. The following year she became a member of the Academy of Sciences of Bucharest, and in 1890 she visited England. She pub. sev. vols. of romances, poetry, and philosophical writings—chiefly written in Ger.—including *Les Pensées d'une reine* (1882), *Das Leben meines Bruders Otto Nicolai, Prinz zu Wied* (1883), *Pilgrim Sorrow* (trans. 1883), *Eucarest* (1892), *Gegensätze*

Worte (essays, 1903, 1906), *In der Lunca* (1904), *A Royal Story Book* (1911), *From Memory's Shrine* (trans. of Reminiscences, 1911), *Poems* (trans. 1912), *Sparks from the Anvil: or Thoughts of a Queen* (1913). She wrote in Eng., Fr., Ger., and Rumanian. Queen-dowager, 1914.

Elizabeth (Elizabeth Philippine Marie Hélène de France) (1764-94), known as 'Madame Elizabeth', sister of Louis XVI., b. at Versailles, guillotined on May 10, 1794.

Elizabeth, St., of Hungary (1207-31), daughter of Andrew II., king of Hungary, b. in Prossburg. She married at a very early age Louis IV., landgrave of Thuringia. He was converted by the miracle, much celebrated in Ger. legend, of the changing of the bundle of bread, carried by E. for the poor, into red roses, on his sternly commanding her to display the contents. Louis died in 1227, and E. being persecuted by her brother-in-law, Henry Raspe, retired to Marburg, where she eventually died. Four years later she was canonised by Gregory IX. on account of the frequent miracles reported to have been performed at her tomb. See C. F. R. de Montalembert, *L'Histoire de Sainte Elisabeth de Hongrie*, 1836.

Elizabeth Petrovna (1709-62), Empress of Russia and daughter of Peter the Great, b. near Moscow. She succeeded to the throne in 1741. The great event of her later years was the Seven Years' War, when the Russians many times defeated Frederick the Great. E. was of a licentious, idle temperament, but inherited some of her father's genius for gov. She was also a patroness of art and literature, and was one of the founders of Moscow Univ.

Elizabeth of York (1) Queen of Henry VII., and mother of Henry VIII.; eldest child of Edward IV. and his queen, Elizabeth Woodville; born at Westminster. Married Henry, 1486. Stricken with grief at the loss of her eldest son, she died in imprisonment in the Tower. (2) (Alexandra Mary, Princess) elder child of George VI.; heir-presumptive to the throne of Britain; born at Royal Lodge, Windsor Great Park, on April 21, 1926; married Lieut. Philip Mountbatten, duke of Edinburgh, Nov. 20, 1947, and has heir, Prince Charles Philip Arthur George, b. Nov. 14, 1948.

Elizabeth, Valerie Gabrielle Marie (b. 1878), queen-dowager (since 1934) of the Belgians, was born at Posenhofen; second daughter of duke Charles Theodore of Bavaria; married 1900, to Albert, afterwards king of the Belgians.

Elizabethan Architecture, style of architecture which was in vogue during the later part of the reign of Elizabeth and in the reign of James I. It was marked by a revival of classic designs brought into the decadent Gothic style. The Marquis of Salisbury's house at Hatfield is a typical specimen of this mixed style.

Elizabethton, city, co. seat of Carter co., N.E. Tennessee, U.S.A., making artificial silk, etc. Pop. 8500.

Elizabeth Tunnel, 60 m. N. of Los Angeles, California, U.S.A., penetrates the Coast Range Mts. and is five m. long.

Elizavetpol, see GANDZHA.

Elk, or Moose, *Alces alachis*, the largest living species of forest deer. It is known in the Old World as the E., but in America as the moose, the American 'E.' or wapiti having less resemblance to the European broad-horned deer than to the red deer. The E. is distributed over the forested regions to the N. of Europe and Asiatic Russia, and it is now everywhere protected by laws, and carefully preserved. It is easily tamed and has frequently been trained to draw sleighs. The antlers, found in the male alone, have their basal portion, which is in the form of a short cylinder, in the same plane as the forehead. The base expands into a huge, broad 'palm,' at the edge of which are short branches. The height at the shoulders is about 6 ft. In the breeding season, the males fight with great fury, inflicting such wounds with their horns that the combats frequently result in death.

Elk, Irish, *Cervus megareros*, extinct species of deer closely allied to the fallow-deer of the present day, the bones of which are found among the clays and marls of the Irish bogs and also in certain parts of Great Britain and the continent. It stood 6 ft. in height, and is characterised by the enormous size of its antlers, which sometimes had a spread of close on 11 ft. Extinct after the coming of man to Europe.

El Kantara, tn. of Egypt, on the Suez Canal. In the First World War it was the scene of a victory over the Turkish advance guard in 1915. Pop. 25,000.

El Khargeh, or **The Great Oasis**, large and fruitful valley in the Libyan desert, the most S. of the Egyptian oases. From 80 to 100 m. long and 10 m. broad.

Elkhart, city of Elkhart co., Indiana, U.S.A., on the St. Joseph R. Important manuf. centre: has automobile and machine industries, and makes paper, musical instruments, and iron bridges. Pop. 33,400.

Elk-Hound, small Norwegian dog which much resembles the Eskimo dog (*q.n.*), but is considerably smaller in size. Its coat is thick, with a full under-coat, and the tail is bushy. The colour is grey, with a darker shade on the back.

Elkins, city of W. Virginia, co. seat of Randolph co., in a lumbering and coal mining region, has various manufs. and a college. Pop. 8100.

Ell (Lat. *ulna*, the forearm), measure used to denote length, originally taken in some way from the forearm. The E. varied in different countries, thus the Eng. E. as a measure of cloth is equal to 1½ yds., the Flemish to ¾ yd., and the Fr. to 1½ yds.

Ells, see **ELLA**.

Ellagic Acid, or **Gallogene** (C₁₂H₆O₆), yellow, odourless powder of agreeable taste only soluble in alkalis. Medicinally it is used as an astringent in cases of tuberculosis and inflammation of the bowels, becoming active only on reaching the alkaline fluids of the intestines.

Elland, tn. in W. Riding of Yorkshire, England. Manufs. woollens and fireclay goods, and has iron and dye works. Pop. 19,200.

Ellenborough, Edward Law, first Baron (1750-1818), was educated at Charterhouse and Cambridge. In 1771 he became a pupil of the special pleader, George Wood (afterwards a baron of the Exchequer), and four years later began practising on his own account with great success. Called to the Bar in 1780, he was soon in the enjoyment of a large practice. His first great chance came in 1788 when he was retained as leading counsel for the defence of Warren Hastings. His admirable conduct of this case made him famous and long before it had reached its close he was engaged in many of the most important trials of his day. In 1802 he succeeded Kenyon as Lord Chief Justice, and was raised to the dignity of Baron E. In 1806 he was offered the post of Lord Chancellor in the 'Talents' ministry, but this he declined, though he joined the cabinet without office. Through ill-health he retired from the bench in Nov. 1818. His biography will be found in J. C. Campbell's *Lives of the Chief Justices of England*, 1837 (vol. iii.).

Ellen's Isle, small is. of Perthshire, Scotland, situated in Loch Katrine. It is celebrated in romance, and immortalised by Sir Walter Scott, who made it the haunt of the Lady of the Lake.

Ellerman, Sir John Reeves (1862-1933); Eng. shipowner, financier, and newspaper proprietor, son of John Harman E., of Hull, a native of Hamburg. Early joined the board of Frederick Leyland's company, the first unit of what eventually developed into the Ellerman group. This group, registered as the London, Liverpool and Ocean Shipping Co., included under the one management the Paypayanni, City, Hall, Westcott, Laurences and other lines, and, in 1913 acquired the share cap. of Bucknall's Steamship Lines, the name of which was changed in 1914 to Ellermans and Bucknall Steamship Company. He was also chairman of Ellerman's Wilson Line. Left a fortune of £30,000,000. Baronet in 1903, Companion of Honour in 1921.

Ellesmere: (1) Urban dist. in Shropshire, 16 m. N.N.W. of Shrewsbury. Pop. 1800. (2) Is. of the Arctic regions, Canada, W. of Smith Sound, and opposite N.W. Greenland. It is almost entirely ice and snow-covered wastes.

Ellesmere, Francis Leveson-Gower Egerton, first Earl of (1800-57), Eng. politician and writer, the second son of the first duke of Sutherland. From 1828-30 he was Irish Secretary, and secretary for war in 1830. Amongst his writings are a trans. of *Faust* (1824), *Mediterranean Sketches* (1843), *History of the War of the Sicilian Vespers* (1850), *Personal Reminiscences of The Duke of Wellington* (1903, pub. by his daughter).

Ellesmere Canal, Cheshire, England, belonging to the Manchester Ship Canal, and connecting the Severn and Mersey. Length, 68½ m.

Ellesmere Port, urban dist. and seaport of Cheshire, England, on the Mersey, 6½ m. N. of Chester at the junction of Ellesmere Canal and the Manchester Ship Canal. It is a depot for iron ore and

pig iron and has large docks and warehouses. Pop. 13,000.

Ellet, Charles (1810-62), Amer. engineer, b. in Penn's Manor, Bucks co., Pennsylvania. The first wire suspension bridge of the U.S.A., at Fairmount, Philadelphia, was his work, and he constructed most of the prin. iron and steel bridges in the U.S.A. He is chiefly remembered as the inventor of naval rams, and in the Amer. Civil war equipped nine Mississippi R. steamboats as rams, defeating a fleet of Confederate rams. He met his death during a naval engagement.

Ellice, or Lagoon Islands, see GILBERT AND ELLICE ISLANDS.

Ellichpur, or Ellichput, city in Berar, India, 100 m. N.W. of Nagpur. It was at one time a great city, but now has little commerce. Contains some interesting ruins. Pop. 23,899.

Elliot, Charles John (1819-1905), Eng. prelate b. at Whitwell, near Stamford, where his father was rector. In 1861 he was made dean of Exeter, and two years later bishop of Gloucester and Bristol. His episcopate lasted forty-two years, and he threw himself vigorously into diocesan work. In 1857 E. was one of the five clergymen who pub. a revision of the gospel of St. John, followed by revisions of the Romans and Corinthians and other epistles.

Elliot - Murray - Kynynmound, Gilbert John, see MINTO, EARL OF.

Elliot, Jane (1727-1805), Scottish poetess, daughter of Sir Gilbert E., b. at Mint House, Teviotdale. The greater part of her life (1756-1804) was passed in Edinburgh. She is remembered for her most exquisite ballad, *The Flowers of the Forest*, a touching lyric on the disaster of Flodden. Sir Gilbert Elliot, her eldest brother, was also a song-writer.

Elliotson, John (1791-1868), Eng. physician, b. at Southwark, London. He studied medicine at Edinburgh and Cambridge, and in 1834 became physician to Univ. College Hospital. He was a student of hypnotism and mesmerism, and in 1838 was compelled to resign his offices on this account. He edited a magazine, *The Zoist*, devoted to the subject, and founded a mesmeric hospital in 1849. E. was one of the first Brit. physicians to advocate the use of the stethoscope. Among his pub. are: *Lectures on Diseases of the Heart* (1830), *Human Physiology* (1840), *Surgical Operations in the Mesmeric State without Pain* (1843). Thackeray dedicated his *Pendennis* to E.

Elliott, Ebenezer (1781-1849), Eng. poet, the 'corn-law rhymers', b. near Rotherham, Yorkshire. He was educated at various schools, and in 1797 entered his father's iron foundry. He had a successful career at Sheffield as a bar-iron merchant, and on his retirement in 1841 settled at Great Houghton. From the age of seventeen he began writing poems, pub. *The Vernal Walk*, in imitation of Thomson, in 1801. He is chiefly remembered, however, for his *Corn-Law Rhymes* (1831), which are vigorous, simple, and full of a vivid description. They are inspired by a fierce hatred of injustice, and

by their sincerity and earnestness are saved from the common fate of political poetry. See Carlyle's essay, 'Corn Law Rhymes,' in *Critical and Miscellaneous Essays*, 1839; W. Odom, *Two Sheffield Poets*, 1929.

Elliott, May Gertrude (Lady Forbes-Robertson), actress, b. Dec. 14, 1874, at Rockland, Maine, U.S.A., sister of Maxine E. She made her first appearance on the stage at New York with E. S. Willard in *The Middleman*, and was first seen on the London stage at Daly's Theatre in 1895 as Sylvia in *The Two Gentlemen of Verona*. She married Sir Johnston Forbes-Robertson in 1900, and has since played many leading parts with him. Her most successful rôles were those of Desdemona; Ophelia; the 'slavey' in *The Passing of the Third Floor Back*; Little Britain in *Mice and Men*; and Maisie in *The Light that Failed*. Her later parts included Gina Ashling in *The Eyes of Youth*, 1918; Sarah Gilman in *Sarah of Soho*, 1922; and Maria in *Twelfth Night*, 1927.

Ellipse. In general language an E. is a regular oval. In geometry it may be defined in a number of different ways: (1) The section of a cone by any plane less inclined to the base of the cone than is the side of the cone. (2) An oblique section of a right cylinder or the oblique projection of a circle. An E. is the orbit of a particle moving under the influence of a central force, which varies inversely as the square of the distance of the particle. This law is the gravitational law of force, and an E. represents the orbit of a planet, if the individual planet and the sun are considered alone (the other planets exert attractions and disturb the orbit).

The foci of an E. are the points S and S' (see diagram) such that the sum of the distances SP and S'P of any point on the

(ON and OT) are connected by the equation:

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$$

(where ON = x and OT = y).

The **diameter** is any straight line through the centre, terminated by the E., such as GOG'. The **directrix** is the line MK, such that the distance of P from the focus S bears a constant ratio less than unity to the distance of P from MK.

Ellipsoid, in geometry, a solid body whose plane sections through one of the axes are ellipses; all other sections are ellipses or circles. The term is often used to indicate the solid body generated by the rotation of an ellipse about one of its axes; but it is better to use the term spheroid for this body. The E. is very largely used in the mathematical theories of elasticity, heat and light, e.g. the strain E., E. of expansion, or the wave surface in a doubly refracting substance.

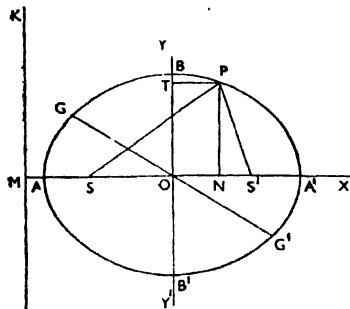
Elliptic Compasses. The trammel, or E. C., depends on the fact that the sum of the distances of a point on an ellipse from the foci is a constant.

Elliptic Polarisation. Elliptically polarised light, when examined with a Nicol's prism, will give an illumination which will vary as the Nicol is rotated. It is thus distinguished from ordinary light, but not from a mixture of ordinary and plane polarised light. It may be distinguished by first passing the light through a quarter wave plate of mica with its axis parallel or perpendicular to the plane of maximum polarisation; for elliptically polarised light thus becomes plane polarised, and may be extinguished on rotating the Nicol's prism.

Ellis, Alexander John (1814-90), Eng. phonetician, mathematician, and musician. His original name was Sharpe, but he assumed the surname Ellis (1825). He was associated with Sir J. Pitman, founding the system of printing known as 'phonotypy.' His works include *Phonetics* (1844), *The Essentials of Phonetics* (1848), *Pronunciation for Singers* (1877), and *The History of Musical Pitch* (1880). He also wrote papers and books on mathematics and philosophy and produced phonetic texts of standard works, and was editor of *The Phonetic Friend* (1849) and *The Spelling Reformer* (1849-50).

Ellis, George (1753-1815), Eng. writer, sprang into notoriety in 1778 with the pub. of *Poetical Tales*, by Sir Gregory Under. He was one of the contributors to the *Rolliad*, and in later years, with Canning, founded the *Anti-Jacobin*. In 1790 he pub. *Specimens of the Early English Poets*, and fifteen years later, *Specimens of Early English Romances in Metre*.

Ellis, Sir Henry (1777-1896), Eng. antiquarian, assistant librarian at the Bodleian, Oxford, and the Brit. Museum (1800), chief librarian of the Brit. Museum (1827-56). His works include an ed. of Brand's *Popular Antiquities* (1813) of Dugdale's *Monasticon* (with others 1817-1833), *Introduction to Domesday Book* (1816), *Original Letters Illustrative of*



E. from the foci is the same whatever the position of P. The straight line AA' passing through the foci is the **major axis**, and the line BB', perpendicular to AA' at its middle point, is the **minor axis**. If $AA' = 2a$ and $BB' = 2b$, $C^2 = A^2(1 - e^2)$, where e is the eccentricity. Also $SP + S'P = 2a$. If AOA' and BOB' be taken as the axes, the co-ordinates of the point P

English History (three series, 1823-46), *Elgin Marbles of the Classic Ages and The Townley Gallery of Sculpture* (1847). E. was director of the Society of Antiquaries for many years.

Ellis, Henry Havelock (1859-1939), fellow of the Medico-legal Society of New York, b. in Croydon, Surrey. He was educated at St. Thomas's Hospital, and was engaged in teaching in New South Wales (1875-79). Returning to England, he practised as a doctor, but soon abandoned this profession to devote himself to literature. His psychological and sociological works, and miscellaneous writings include *Man and Woman: A Study of Human Secondary Sexual Characters* (1894, 1904, 1914, and 1934), *Sexual Inversion* (1897), *The Evolution of Modesty* (1899 and 1910), *The Soul of Spain* (1908), *Sex in Relation to Society* (1910), *The World of Dreams* (1911), *Impressions and Comments* (1914-24); *Essays in War-Time* (1916), *Kanga Creek* (1922), *Sonnets with Folk Songs from the Spanish* (1925), *Chapman, with Illustrative Passages* (1931), *Questions of Our Day* (1936), and *Selected Essays* (Everyman's Library, 1936). See H. Peterson, *Havelock Ellis, Philosopher of Love* (with bibliography), 1928.

Ellis, Robinson (1834-1913), Eng. philologist and classical scholar, educated at Guernsey, Rugby, and Oxford. He pub. numerous critical works on Catullus and trans., *Catulli Veronensis Liber* (1867, 1878), *Fragments of Catullus* (1871), and *Commentary on Catullus* (1876). Other works are Ovid's *Ibis* (1881), *New Fragments of Juvenal* (1901), *Appendix Vergiliana* (1907), *The Annalist Licinianus* (1908), *The Amores of Ovid* (1912), and various articles in many journals and classical reviews.

Ellis, William (1791-1872), Eng. missionary, sent by the London Missionary Society to the S. Pacific Islands (1816-25). From 1831 to 1841 he was foreign secretary to the London Missionary Society. His visits to Madagascar resulted in *History of Madagascar* (1838), *Three Visits to Madagascar* (1858), *Madagascar Revisited* (1867), *The Martyr Church* (1870). Other works were *A Tour through Ouchy-see* (1826), and *Polynesian Researches* (1829). See life by J. E. Ellis, 1873.

Ellis Island, small is. in New York harbour, 1 m. from Manhattan Is., used as an immigrant station (since 1892) and as a magazine.

Elliston, Robert William (1771-1831), Eng. actor and manager, first appearing (1791) as Tressell in *Richard III.* at Bath. In 1796 he came to the Haymarket, London, and was manager there (1803). E. was considered one of the finest actors of his day, especially in comedy, and was praised by Lamb and Leigh Hunt. See lives by G. Raymond, 1848, 1857, and W. Oxberry, 1826.

Ellon, vil. of E. Aberdeenshire, Scotland, on the Ythan, 12½ m. from Inverurie. Once the cap. of Buchan, the vil. belonged to Kinloss Abbey. Pop. 1300.

Ellora, The caves of, in the Nizam of Hyderabad's dominions, India, 2 m. from

the walled tn. of Ravva or Khuldabad, the holy shrine of the Deccan Moslems, and the burial place of the Emperor Aurangzeb and many other celebrities. Ravva is now in great part deserted, and ruins of mosques and tombs abound in every direction. The E. group of cave temples comprises twelve Buddhist, seventeen Brahman, and five Jain works. They are mentioned by an Arab geographer of the fifteenth century as a celebrated place of pilgrimage. The Buddhist caves date from A.D. 350-750. The Brahman caves were probably constructed in the seventh and eighth centuries A.D. There are sculptures of the slaughter of the Buffalo demon, Siva and Parvati playing chess, three skeleton demon gods, Bhairava with a necklace of skulls, three riv. goddesses, etc. The five Jain caves date from the eighth to the thirteenth century.

Ellore, tn. of Godavari dist., Madras, India, 37 m. from Masulipatam, near Lake Kolar. It was once the cap. of the N. Circars. There are carpet manufs. Pop. about 30,000.

Ellsworth, city of Hancock co., Maine, U.S.A., at the mouth of Union R., 27 m. S.E. of Bangor. It has a trade in timber and fish. Pop. 4000.

Ellsworth, Lincoln (b. 1880), Amer. explorer, born at Chicago, accompanied Amundsen (for whom he provided support) on his first polar flight, 1925; and in the following year in the airship *Norge* from Spitsbergen to Alaska. He pub. *First Crossing of the Polar Sea* (1926) and *Beyond the Horizon* (1938).

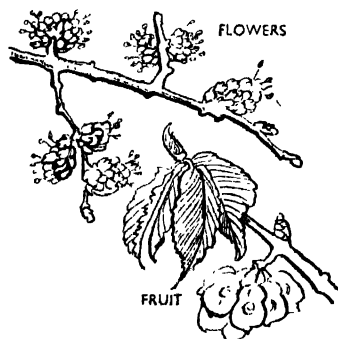
Ellsworth, Oliver (1745-1807), Amer. statesman and jurist, b. at Windsor, Connecticut; studied at Yale and Princeton, and practised law at Hartford, 1771. Was a member of the General Assembly of Connecticut, and held many legal and political offices in the state. Advised Washington to send Jay to England to negotiate a new treaty. Appointed by Washington as chief justice of the Supreme Court, 1796, and was sent by Adams to France to negotiate a new treaty.

Ellwangen, tn. of Germany, in Württemberg, and cap. of Jagst, W. of the Ellwangen int. crowned by a castle built in 1354, containing a collection of antiquities and the Schönenberg with a pilgrimage church. It possesses many fine churches and owes its origin to a monastery founded in 750 A.D. Pop. 5700.

Ellwood, Thomas (1639-1714), Eng. author and Quaker preacher, intimate friend of and reader to Milton after he became blind. E. first suggested to Milton the idea of his second epic, *Paradise Regained*, after reading the MS. of *Paradise Lost* (1665). E.'s own works include: *Forgery no Christianity* (1671), *Sacred History of the Old and New Testaments* (1705-9), and other polemical works; *Davidica* (a poem, 1712), and *Autobiography* (1714).

Elm, the name applied to species of *Ulmus*, four of which occur in Britain, while all the sixteen are to be found in N. lands and on Asiatic mts. There are some eighteen species of the *Ulmus* genus of the *Ulmaceæ* family and all are easily

cultivated, flourishing in almost any soil or situation. The fruit is characteristic, being a one-seeded samara, and the leaves are curious, the sides being unequal in size. *U. campestris*, the common or small-leaved E., and *U. montana*, the wych-elm, are our best-known species; *U. Americana* is a tall tree and yields a good timber. The common E. is abundant in England, France, Spain, and Italy; it sometimes attains great age and size, endures in smoky tn. conditions and is familiar in London parks. Formerly its timber was used for water-pipes and the



COMMON ELM

keels of ships. The wych E., also indigenous in Great Britain, is also known as the Scotch E.

Elmalu, see **ALMALI**.

Elman, Mischa (b. 1891), Russian violinist of Jewish descent born at Talmoi, Russia. Trained by Fidelmann and Auer. He first appeared in London in 1904 and in New York, 1906, and is now one of the leading violinists of the world.

Elmina, or **St. George del Mina** (native Odena), dist. and fort. tn. of the Gold Coast Colony, W. Africa formerly (till 1872) cap. of the Dutch possessions in Guinea. Close by is the inlet of Baya, with the suburb Garden Town. It was founded about 1482. It exports palm oil, gold and ivory. Pop. 20,000.

Elmira, cap. of Chemung co., New York, U.S.A., on Chenung R. (Newtown Creek), 74 m. from Syracuse. An important railway centre. The more important industries include railroad car shops, steel bridge plants, valve and radiator works, and the manuf. of shoes, fire engines, silk and knitted goods and bicycles. It is the seat of Elmira College for Women, and of the noted Reformatory. Pop. 45,100. See A. Winter, *The Elmira Reformatory*, 1891.

El Misti, or **Arequipa Volcano**, grand, almost extinct volcanic mt. of the Andes, Peru (c. 20,000 ft.), close to Arequipa. Harvard Univ. erected a meteorological observatory near the summit, in use from 1893 to 1901. There are various stations at Mont Blanco (15,700 ft.), Pampa de los

Huesos (13,400 ft.), and Mollendo (sea-level). The name is also applied sometimes, but incorrectly, to Huayna Putina volcano, S.E. of Arequipa.

Elmshorn, tn. of Schleswig-Holstein, Germany, noted for manufs. of textiles, margarine and sausages. It carries on a shipbuilding and tanning trade. Pop. 16,000.

Elmsley, Peter (1773-1825), Eng. philologist, classical scholar, and critic. He assisted Davy in deciphering the papyrus found at Herculaneum (1819). E. produced excellent critical ed. of sev. dramas of Sophocles and Euripides. See F. E. Greville (ed.), *Elmsleiana Critica*, 1833.

El Obeid, or **Il-Obeid**, cap. of Kordofan, Egyptian Sudan, Africa, 240 m. from Senaar. There are sev. mosques and the barracks of the Sudan Camel Corps. An Anglo-Egyptian army, under Hicks Pasha, was annihilated by a Mahdist force close by (1883). It is the terminus of the railway from Cairo. Pop. 18,000.

Elocution (Lat. *elocutio*, from *eloqui*, to speak out), a branch of oratory which teaches the art of effective speaking, especially public speaking, having regard solely to the utterance or delivery. It directs the proper use of gesture, the modulation of the voice, and deals generally with the methods of speaking. In ant. times E. held a prominent place in education, and great attention was paid to the study of it in Greece and Rome. Nowadays it is even more carefully cultivated in the U.S.A. than in Britain, its teaching having diminished in the latter country during the second half of the nineteenth century. See D. C. and A. M. Bell, *Standard Elocutionist*, 1873; T. G. Summels, *The Art of the Elocutionist*, 1932; J. Bernard, *Lessons in Elocution*, 1933; Z. R. Cree, *Elocution and Voice Production*, 1935.

Eloge (eulogia, praise), an encomium or panegyric oration in honour of a deceased person, describing his merits and services, especially one pronounced by the secretary of the Fr. Academy, or by a newly-elected member on his predecessor. These *eloges académiques* form a considerable branch of Fr. literature. See the *Eloges* of Fontenelle (1731). Thomas (1739-70), Alenbert (1779-87). Cuvier (1819-27), and Flourens (1833-67).

Elohim (Heb. plur. of *Eloah*, God), one of the chief names by which God is designated in the Heb. Scriptures. The plural expresses the idea of greatness and supremacy, and is mainly used with a singular verb as a title of the Supreme Being, especially in N. Heb. literature. It was probably of later date than the title 'Yahweh' (Jehovah), which was considered as a more personal and intimate name for the Deity. Writers of O.T. passages (especially of the Pentateuch) in which the name E. occurs are called Elohist. (See JAHVIST.) See E. Kautzsch, *History of Old Testament Literature* (Taylor's trans.), 1898.

Elohist, see **HEXATEUCH**.
Eloi or **Eligius**, Saint (587-c. 659), Fr. benefactor, founder of many monasteries

and hospitals. He was a favourite minister of Clotaire II. and Dagobert I. He is the patron-saint of jewellers and goldsmiths. In 640 he became bishop of Noyon.

Elongation, in astronomy, the angular distance of a heavenly body from some relatively fixed point, such as the angular distance of a planet from the sun or of a satellite from its primary, as seen from the earth. Thus the angular distance of Venus is about 45°.

Elopement, the secret departure of a woman from the house or home to which she is bound by ties of law or duty. The word is most commonly applied to the conduct of a daughter who runs away from her father to contract a clandestine marriage with her lover. Thus, from 1754 until 1856 Eng. sweethearts would elope to Greta Green, a border vill. of Scotland, where they could easily and quickly become legal man and wife. In the latter year an Act made residence in Scotland for at least twenty-one days necessary for one of the parties.

El Paso, port and cap. of E. P. co., Texas, U.S.A., on the Rio Grande, opposite Ciudad Juarez (El Paso de Norte), Mexico. The industries include smelting, flour-milling, railway car repairing, box-making and meat packing, and the trade is in copper, silver, lead, wool, hides, and live stock, especially with Mexico. Seekers for nearly perennial sunshine find it at E. P., at an elevation of 3800 ft. Pop. 96,800.

El Paso del Norte (Mexico), see CIUDAD JUAREZ.

Elphin, tn. of co. Roscommon, Ire, formerly the seat of a bishop. The see, however, no longer exists, having been united with Kilmore in 1833. Pop. 700.

Elphinstone, George Keith, see KEITH, VISCOUNT.

Elphinstone, Mountstuart (1779-1859), Eng. historian and statesman, son of the eleventh Baron E. Educated at Edinburgh and Kensington, he entered the Civil Service of the E. India Company (1796), and became one of the founders of the Anglo-Indian empire. E. was aide-de-camp to Wellesley (1803), sharing in his campaign; envoy to Kabul (1808), and resident at Poona (1810-17). He helped to win the Battle of Kirki against the Mahrattas (1817), and was made governor of Bombay (1819-27). He ruled wisely in the Deccan, but refused the governor-generalship of India owing to ill-health. He wrote: *Account of the Kingdom of Cabul, and its Dependencies in Persia, Tartary, and India* (1815, 1839), *The History of India* (1841, 1866), and *The Rise of British Power in the East* (ed. by Sir E. Colebrooke, 1887). See life by Colebrooke, 1884.

Elphinstone, William (1431-1514), Scottish prelate and statesman, Bishop of Aberdeen (1483), and founder of King's College, Aberdeen (1494, completed 1508). He helped to estab. the printing-press of Chepman and Millar in 1507. His chief work is the *Brevitium Aberdeenense* (1509-10, reprinted 1853). See H. Boece's

Memoir (J. Motr's trans.), 1894; A. Gardyne, *Luf of W. Elphinston*, (D. Laing's ed.) 1878.

El Reno, tn. of Oklahoma, U.S.A., 30 m. from Oklahoma. Has a collection of Indian curios and relics, a remount station for the U.S.A. Army and graded schools for Indian children. It is on the Meridian auto highway from Winnipeg to the City of Mexico. Its industries include railroad shops and incubator factories. Pop. 10,000.

Elsene, see IXELLES.

Elsheimer (or Elzheimer), Adam (c. 1574-1620), Ger. landscape-painter. He worked largely in Rome, and was called by the Its. 'Adamo Tedesco.' His pictures are mostly small and beautifully finished. He excelled in colour and chiaroscuro, and in imitation of nature, and his scenes by torchlight and moonlight were much admired. E. was founder of the school later represented by Rembrandt and Claude Lorrain. His works include: 'Flight into Egypt' (Louvre), 'Ceres in Search of Persephone', 'Tobit and the Angel' (engraved by Count Goudt), 'Christianity Triumphant over Paganism', 'Martyrdom of St. Lawrence' (National Gallery). See lives by W. Drost, 1933, and F. Bothe, 1939.

Elsinore, see HELSINGOR.

Elssler, name of two celebrated Austrian dancers. *Therese* (1808-78) and *Fanny* (1810-84). They made tours in Europe and America. Beautiful, of kindly disposition, and possessing complete mastery of their art, they were everywhere beloved and admired.

Elster, Black, or *Schwarze*, riv. of Germany, rising in Upper Lusatia, E. Prussian Saxony. The B. E. flows into the Elbe, 9 m. from Wittenberg. Length about 112 m., of which 37 are navigable. A branch, the Neud Graben, forms an is. 19 m. long.

Elster, White, riv. of Germany, flows N. past Greiz, Gera, and Leipzig, finally joining the Saale 3 m. from Halle. A branch, the Luppe, also flows into the Saale. Length about 120 m. Little of the riv. is navigable.

Elstow, par. of Bedfordshire, England, 2 m. from Bedford. John Bunyan was born in this vil. (1628). Pop. 400.

Elswick, a par. and W. suburb of Newcastle, Northumberland, England. It has rapidly increased in importance since the opening of Armstrong's engineering works (1847). Pop. 12,000.

Eltham, a par. of the bor. of Woolwich, England, pleasantly situated 3 m. S. of Woolwich. Its royal palace of King John was largely destroyed during the Commonwealth, but the banqueting hall remains. E. has associations with Sir Thomas More, whose house still stands. Pop. 35,000.

Elton, shallow salt lake in the Astrakhan Region of the R.S.F.S.R. It receives eight salt-water streams and has no outlet. The Crimean salt fields now provide supplies for which E. was once worked.

Elton, Charles Isaac (1839-1900), Eng. jurist and ethnologist. His valuable *Origins of English History* (1882) deals with the Celtic element in the Eng. race.

He wrote also *Custom and Tenant Right* (1882).

Elton, Oliver (1861-1945), Eng. literary historian. Educated at Marlborough and Corpus Christi College, Oxford. Prof. of Eng. Literature at univs. in England, America, and India. Became President of Eng. Association in 1932, and honorary member of the Modern Languages Association of America. Among his pubs. are: *The Augustan Ages* (1899), *Michael Drayton* (1905), *Survey of English Literature from 1730-1830* (1912-1928), in which he combined delicacy of portraiture with a careful study of contemporary culture and hist.; *The English Muse* (1933); and *Lascelles Abercrombie* (1939).

Elutriation (Lat. *elutriare*, to wash out), the process of separating lighter and heavier pulverised substances by washing out or decanting. The method is employed in the preparation of clay and other materials for pottery manuf. The material is placed with water in a vat where grinding wheels pulverise the material and keep the water flowing; the finer particles pass with the water into settling vats where they are deposited.

Elvan, name given by Cornish miners to dykes of quartz-porphphy, granite-porphphy, or other Plutonic rock found in association with granitic and penetrating sedimentary strata. The rock is granular and crystalline and is called by geologists 'quartz-felsite.' It is used for road-mending and for building stone.

Elvas, strongest fortified city of Portugal, near the Sp. frontier, 10 m. W. of Badajoz; trade in wool, wines, fruits, and oil; fine old Rom. aqueduct. It has a Rom.-Moorish castle, cathedral, theatre, library, etc. Pop. 12,000.

Elves, see **ELF**; **FAIRIES**.

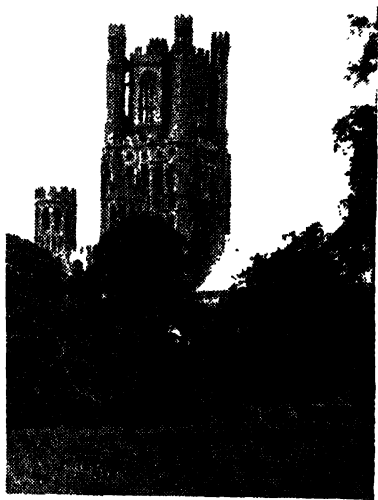
Elvey, Sir George Job (1816-93), Eng. organist and composer, born at Canterbury, where he became a chorister in the cathedral. When only nineteen he was appointed organist at the Chapel Royal, Windsor. He composed two oratorios, many anthems, etc., and the tune to 'Come, ye thankful people come.'

Elwes, Gervase Henry (1866-1921), Eng. tenor, born at Billing, Northants; son of V. D. H. Cary-Elwes. He was educated at the Oratory School, Edgbaston, Woburn School, and Christ Church, Oxford. He entered the foreign service and was hon. attaché at Munich, 1891, and later at Vienna and Brussels where he studied music. E. abandoned diplomacy in 1895. His first public appearance as a singer was at the Westmorland festival in 1903. He sang in 150 performances of *The Dream of Gerontius*. While travelling in America he was killed by accidental blow from door of a train in Boston, Massachusetts.

Elwood City, bor. of Lawrence co., Pennsylvania, U.S.A., 36 m. N.W. of Pittsburgh, manufacturing steel, brass, etc. Pop. 13,000.

Ely, city of Cambridgeshire, 16 m. N.N.E. of Cambridge, situated on rising ground near the R. Ouse in the midst of the fens. It was one of the last strongholds of the Saxons; here Hereward's

'camp of refuge' held out against the Conqueror. Its cathedral is one of the finest of the Christian churches, and one of the largest in England. It presents examples of Saxon, Norman, and early Eng. architecture. On its site St. Etheldreda founded, in 673, a monastery, which the Danes burnt down in 870; Ethelwold, Bishop of Winchester, founded a Benedictine abbey about the year 1000; the present cathedral was begun in 1083 and finished in 1534. Its length is 530 ft., breadth across the transepts 180 ft.,



John H. Stone

ELY CATHEDRAL FROM CASTLE HILL

height 62 ft., the western tower is 225 ft. high. Between 1322 and 1342 the central tower fell, and the decorated lantern tower, built by Alan de Walsingham to replace it, is one of the most interesting features of the cathedral as being the only existing specimen of a Gothic dome. The choir exhibits great splendour of carving and sculpture. Among historical personages connected with E. are bishop Thurston and King Canute. Oliver Cromwell lived here 1636-40. King's School, a public school for boys, was founded in 1543. Brewing and market-gardening are carried on, and pottery and clay pipes are manufactured. Pop. 8,300. See W. D. Sweeting, *Ely Cathedral*, 1901; B. E. Dorman, *The Story of Ely and its Cathedral*, 1946.

Ely, Isle of, see **ISLE OF ELY**.

Elymais, tn. and dist. of Susiana, in Persia, which derived its name from the Elymaei or Elym, a warlike and predatory people who were also found in the mountains of Great Media, and were probably among the most ant. inhab. of the

country N. of the head of the Persian Gulf. The tn. contains a famous temple which Antiochus the Great wished to despoil in order to pay his tribute to Rome. In the O.T. Susiana is called *Elam*.

Elymas, the title of Bar-jesus, who in the presence of Sergius Paulus, governor of Cyprus, withstood Paul and Barnabas (*Acts*, ch. xiii). E. is explained as *Magos*, 'Sorcerer,' and the word seems akin to the Arabic 'alama,' 'to know,' whence 'alim,' 'learned Man.' E. seems to have been a representative of that system of interpreting Nature and natural powers which in the anct. world took the place now occupied by science. It claimed to be a religion as well, and wonders wrought by means revealed only to the initiated, possibly at times by legerdemain and at others by recondite forces, were relied upon to secure adherents. E. doubtless regarded Paul and Barnabas as rivals competing for the favour of the governor, and employed his black arts against them. Paul replied in kind; and the blindness that fell upon the 'sorcerer' was demonstration of a power behind the apostle greater than any known to E. The Cypriot, Simon, who assisted Felix against Drusilla, and Simon Magus, probably belonged to the same class.

Elyot, Sir Thomas (c. 1490-1546), Eng. writer and diplomatist, best known as the author of *The Boke named the Governour*, the first treatise on education written and printed (1531) in Eng. In 1511 he was clerk of assize, while his father was judge; Henry VIII. employed him on several diplomatic missions. He was a friend of Sir Thomas More. Among his many works are: *The Dictionary of Syr T. Elyot* or *Bibliotheca Elyota* (1538), a Lat.-Eng. dictionary still of philological interest; *The Castel of Heith* (1539), *The Defence of Good Women* (1545), and *The Image of Governance*, an allegorical work in which he attacks the vices of his time. See C. Bendorf, *Die englische Padagogik im 16. Jahrhundert*, 1905, and F. Watson (ed.), *The Governour* (Everyman's Library).

Elyria, city of N. Ohio, with many manufs., including laces, heaters, invalid chairs, fishing tackle, chemicals, golf balls, automobiles and engines. Pop. 25,100.

Elysium, or The Elysian Fields, in anct. mythology the place where dwell in perfect happiness the departed heroes and virtuous men favoured by Zeus. Homer's Elysium is a beautiful meadow at the W. extremity of the earth, on the banks of the R. Oceanus. Subsequent poets deviate somewhat from Homer's conception.

Elytra (Gk. *ἐλῦτρα*), the name given to the horny sheaths which constitute the fore-wings of beetles. They fold over the back, generally meeting in the middle in a straight line, and serve to protect the hind-wings and the soft posterior parts of the body. The presence of E. is the distinguishing mark of beetles, but they are also to be met with in earwigs.

Elze, Frederick Karl (1821-89), a Ger. writer, who became a celebrated Shakespearean scholar. He was born at Dessau and was appointed to the chair of Eng. at Halle in 1875. He wrote *William*

Shakespeare, Englischer Liederschatz (1876), a work on the Elizabethan dramatists (1880-86), and trans. *Hamlet*.

Elzevir, the name of a family of celebrated Dutch printers and publishers of the sixteenth and first half of the seventeenth centuries. The Rs. issued beautiful eds., whose value time has increased. The family is supposed to have come from Liège or Louvain, or possibly even from Spain. The founder of the E. Press was Louis (1540-1617), born at Louvain, but who, as a supporter of the Reformation, took refuge in Leyden, where—and subsequently at The Hague—he became a bookseller and publisher. He was succeeded by his five sons, *Matthias*, *Louis*, *Gilles*, *Joost*, who practised in Utrecht, and *Bonaventura* (1583-1652), who carried on the Leyden house in association with his nephew, *Abraham*, for twenty-six years, during which time most of its masterpieces were issued. Many of these were printed for his uncle Bonaventura by Isaac, who printed also for his brother Jacob, estab. at The Hague. Isaac was the first printer of the family. Isaac's son, *Louis*, was the founder of the house in Amsterdam. Under him, in association with his cousin *Daniel*, the work reached perhaps its highest standard (1639-55). Of the total number of works (1208) produced by the Es, 968 were Lat., 44 Gk., 22 in Oriental languages, 120 Fr., 33 Flemish, 11 Ger., and 10 It. The house still exists, in Haarlem. See H. B. Copinger, *The Elzevir Press*, 1927.

Elzheimer, Adam, see ELSHEIMER.

Em, measure of type, see under PRINTING.

Emanation (Lat. *emanatio*, a flowing forth), anct. system of philosophy according to which all existences have successively flowed or emanated from the Supreme Essence, from God. This doctrine is found in Egyptian and Indian mythology, in Neoplatonism, and in Christian Gnosticism.

Emancipation, in the Rom. law, was the act by which a father set his son free from paternal authority. The twelve tables required that the son should be formally sold three times, bought back, and then liberated according to the ceremony for freeing slaves. See ABOLITIONISTS and CATHOLIC EMANCIPATION.

Emancipation of Catholics, see CATHOLIC EMANCIPATION.

Emancipation of Slaves, see ABOLITIONISTS; MANUMISSION.

Emanuel I. (1469-1521), king of Portugal, surnamed the Great, the Fortunate; became king in 1495. His reign is the most brilliant in the hist. of Portugal. A code of laws prepared by the king and a court in which chivalry, art, and science were encouraged, greatly improved the internal condition of the country. Externally its possessions were extended by the explorations of Vasco da Gama, Cabral, and Albuquerque, and Portugal became the first naval and commercial power of the world.

Emanuel, Frank Lewis (1865-1948), Eng. artist and critic, b. at Baywater, London. Educated at Univ. College

school, Univ. College, London, the Slade School of Art, and the Académie Julian, Paris. Instructor of Etching, Central School of Arts and Crafts. First exhibited at the Salon, Paris. R.A., 1886. His oil painting, 'A Kensington Interior,' was acquired by the Chantry Bequest for the nation (1912). Other works were acquired by the Victoria and Albert Museum, the Imperial War Museum, and the Ashmolean Museum, Oxford. His mezzotints, etchings and lithographs may be found in various galleries and museums of many foreign caps. His portrait of Lord Rutherford (1936) is at Nelson, New

Zealand. He was for many years special artist to the *Manchester Guardian*. Pubs: *Manchester Sketches*, *The Illustrations of Montmartre*, *William Roxy Beasley, Etching and Etchings* (1930), *Charles Keene* (1935), and numerous articles and art critiques.

while William Hunter used essential oils, camphor, saltpetre, pitch, or resin. Then, again, J. J. Boudet (1778-1849) embalmed with tan, salt, camphor, cinnamon, and other aromatics. Later on, fluids were injected, consisting of sodium chloride, alum, potash, glycerine, or composed of alkalis, arsenic, and alcohol. In the Royal College of Surgeons, London, are still to be seen bodies preserved by William (1718-83) and John (1728-93) Hunter, the renowned anatomists.



United States Information Service - American Embassy

AN EMBANKMENT ON THE MISSISSIPPI

Concrete and steel mats, which will be covered with asphalt, being used to strengthen a Mississippi levee

Zealand. He was for many years special artist to the *Manchester Guardian*. Pubs: *Manchester Sketches*, *The Illustrations of Montmartre*, *William Roxy Beasley, Etching and Etchings* (1930), *Charles Keene* (1935), and numerous articles and art critiques.

Emba, riv. of Kazakhstan, Soviet Central Asia. It rises in the Mugodzhari Hills and flows 380 m. into the Caspian.

Embabane see Mbabane.

Embalming, the art of preparing and preserving dead bodies from decay, principally by the use of medicaments or, according to modern practice, the scientific process of disinfecting and preserving the human dead and restoring ante-mortem appearance by arterial injection. It was widely practised by the ancients, more especially in Egypt, where it was carried to a fine art, and the body so preserved there was called a mummy, a word derived from the Arabic for bitumen. Modern E. dates from the eighteenth century. Dr. Frederick Ruysch, of Amsterdam, is said to have employed alcohol,

overflow of rivs.; a levee, such as the Thames E. Reservoirs are formed of dams, or E. of earth, or, in hot countries, of cement. E. in engineering, therefore, serve two main classes of utility: they preserve the level of railways, canals, and roads where a piece of low-lying ground has to be crossed, or they confine a body of water by preventing it encroaching on the land. In recent years land has been reclaimed by the formation first of E. in the IJssel Meer (Zuyder Zee) in the Netherlands, and in the Wash, England. E. are much used for irrigation purposes, e.g. the great dam of the Nile at Aswan. An E. of concrete and steel mats, which will be covered with asphalt, is being used to strengthen a Mississippi levee. See A. Bazley, *Reclamation of Land*, 1900; R. Minikin, *River and Canal Engineering*, 1920; F. Johnstone Taylor, *River Engineering*, 1938.

Embargo (Sp. stoppage), seizure of a ship or ships, either as a matter of precaution, or in view of hostilities. E. is the most usual form of reprisals, and thus

constitutes the temporary or permanent sequestration of the property of individuals by the gov. in times of peace or war. Es. in anticipation of war, however, have long since fallen into disuse, and it has even become customary for the belligerents to grant a respite to the enemy's trading vessels to leave their ports at the outbreak of war. The Hague Conventions of 1907 confirmed this, and only that power in a state which is authorised to declare war can decree an E., hence, in its hostile sense, it is an act of war. The sequestration by a nation of vessels or goods of its own citizens or subjects for public uses is sometimes called a *civil E.*, in contradistinction to a general prohibition from leaving port intended to affect the trade or naval operations of another nation, known as *international E.*

Embassy, a mission entrusted to an ambas.; the official residence of an ambas. See **AMBASSADORS**.

Ember Days, certain days set apart for fasting and special prayer in the Anglican and Catholic Churches. The clergy are often ordained on certain E. D. The council of Piacentia (1095) fixed these days for the Wednesday, Friday, and Saturday after the first Sunday in Lent, after Whit Sunday, after Sept. 14, and after Dec. 13. The weeks in which E. D. occur are called *Ember Weeks*.

Embezzlement, unlawful or fraudulent appropriation to his own use by a servant or clerk of money or goods received by him for and on account of his master or employer. To convict of this felony (see under **CRIMINAL LAW**) the prosecution must prove that the accused was a clerk or servant of the person robbed, that the money or goods alleged to be embezzled were received for or in the name of or on account of his employer or master, and that the accused intended to appropriate unlawfully such money or goods. The crime of E. is to be distinguished from larceny (*q.v.*) in that the original taking of the property was lawful, while the gist of larceny is the wilfully wrongful taking possession against the will of another from the very beginning. Some specific sum must be proved to have been appropriated, it being settled law that a general deficiency in the accounts of the accused will not suffice to prove the charge. Three separate acts of E. may be charged in the same indictment where committed against the same employer or master, within six months from the first to the last of such acts. If the accused be indicted for E. that will not preclude a conviction for larceny instead, if the facts turn out to be more consistent with the latter crime having been committed. The converse also applies. The punishment for the common law felony of E. is a maximum of fourteen years' penal servitude or imprisonment up to two years. E. by factors, trustees, and directors is a misdemeanour, punishable with seven years' and two years' respectively. See also **FALSIFICATION OF ACCOUNTS**. *Authorities*: S. Harris, *Principles of Criminal Law*, 1899; J. H. Archbold, *Criminal Pleading Practice*, 1883.

Emblements, produce of land, such as crops, garden, cereal, and vegetable products, which are the ann. result of the tenant's labour. These are considered in law as be'onging to the tenant and not to the landlord; they are subject to the same conditions as personal chattels. Trees, grass, etc., are not E. In the U.S.A. the Eng. common law of E. has been very generally adopted, though in some states the tenant is entitled to compensation not only from his landlord, but also from the incoming tenant.

Embolism, plug; a blocking of a blood vessel by a substance carried by the bloodstream from some other part of the circulation. The importance of this condition depends on the source of the plug and its nature, whether it contains infective bacilli, which will cause infective changes at the seat of the plug, or simply acts as a mechanical blocking of the circulation. Both of these are serious, for when the E. lodges in the brain it may produce paralysis, either with a slow or a sudden onset. Emboli are apt to occur in septic conditions, and are characteristic of pyæmia, a condition in which pus-forming germs are found in the blood. Sudden paralysis of the brain is known as apoplexy. The E. may originate from the heart, even in cases in which the victim is unaware of having any cardiac affection. A pulmonary E. may occur in the lung as a sequel to an operation on some infected organ; if special facilities are available, it is sometimes possible to remove the embolus by Trendelenburg's method.

Embossing, the art of producing raised patterns on the surface of metal, leather, cardboard, or similar substances. Strictly, the term applies only to raised impressions made by means of engraved dies or plates, as opposed to those made by carving, chasing, *chiselling*, hammering, and the like. Crests, monograms, and addresses are embossed on notepaper. Dies for plain E. are generally cut deeper than those used with colours. In ant. times goldsmiths made much use of this method of decorating cups, vases, bowls, etc., by beating out bosses from the under surface of the metal in ornamental designs. The finishing touches are generally put from the front. E. is largely used in bookbinding. See Theophilus, *Christian Art of the Eleventh Century*, 1847; L. Haslope, *Repoussé Work for Amateurs*, 1887; J. Harrison, *Decoration of Metals*, 1894; H. Adam and J. Evans, *Metalwork*, 1926; A. Shirley, *Craftwork in Metal*, 1928.

Embracery, the misdemeanour of attempting to influence a juror corruptly to give his verdict in favour of one side or party, by promises, persuasions, entreaties, money, entertainments, or the like. A jurymen who corruptly endeavours to influence his fellow-jurymen to take his view is also guilty of E. The jurymen who consents to give a corrupt verdict is equally guilty with the person persuading. The punishment is fine, or imprisonment, or both.

Embrasure, in military architecture the openings or crenelles between the teeth of

a battlement in parapets, flanks of bastions, etc., are called *E.s.* The name is also applied to the openings in a fort or casemate through which cannon are pointed. In domestic architecture an *E.* is the inward enlargement of the cheeks or jambs of a window or door made by slanting the sides.

Embroidery (Fr. *broderie* from *bord*, edge, which gave the verb *border*, and by transposition *broder*, to ornament the edge), the art of ornamenting in relief with needle and thread of silk, wool, linen, metal, etc., various kinds of fabric. The mummy clothes of anct. Egypt show the earliest extant *E.*, and the 'pomegranates of blue and purple and scarlet' of the book of Exodus were of *E.* Biblical references to the art abound, and the finest and most elaborate work was for ages destined for church vestments and furniture. The Babylonians were renowned embroiderers, whose work was sought after throughout the *E.* The Phrygians, too, were such marvellous embroiderers that the *Gks.* came to call their work *phrygiat*, and the Romans, *opus phrygium*; their name for the beautiful gold-embroidered work, *auriphrugium*, gave the Eng. ecclesiastical word *orphrey*. Homer and other classical writers refer to and describe magnificent embroideries. The art reached its greatest perfection in the early Middle Ages, when also it came to be more widely used for secular purposes. In Greece and Rome laws were made to moderate its use, but without success. The most distinguished artists did not scorn to make the designs from which the highest ladies in the land executed their embroideries. No workers were more skilled in the craft than the Eng., a fact to which the Bayeux tapestry (which is not tapestry, but *E.*) and the Syon Cope (now in the Victoria and Albert Museum) bear testimony. At the times of the Crusades, *E.* was used for heraldic devices and with this a complicated symbolism of colour and design came into being, and this is still observed in heraldic and ecclesiastical *E.* Saxony was the first country to produce 'white embroidery' worked on muslin and other white fabrics, which was used almost exclusively for trimming lingerie and household linen. Switzerland, Scotland, and England later became noted for this particular *E.* which was known as *Broderie Anglaise*, Eng. *E.*, or 'Madeira Work.' Later and more elaborate designs are Renaissance *E.*, Richelieu *E.*, Venetian *E.*, Danish white *E.* (called 'Hedebo'), and 'Pique' *E.*

The Chinese excel as embroiderers, their best work being done on silk, and their needle-painting (i.e. shaded flat stitch *E.*, by which birds, flowers, etc., are reproduced as by brush painting) is exquisite. Gold and silver thread *E.* is sometimes used in Chinese and Jap. work. The Hindus use threads of silk, gold, and silver, together with spangles, beads, pearls, coins, and precious stones. Gold and silver *E.* was used in the seventeenth and eighteenth centuries to decorate ecclesiastical ornaments and vestments. It is usually worked in a frame and the

finer materials are mounted on to a thick fabric before *E.* A *stiletto* (piercing tool) being used for this kind of *E.* work on the heavier materials such as brocades, plush, leather, etc. Gold or silver thread is usually couched, i.e. overcast down with a special fine thread of twisted silk of a matching or contrasting colour.

The instruments needed for *E.*, other than the needle, are sharp pointed *E.* scissors, for cut-out work; a *stiletto* for piercing holes; and frames on which the fabric is stretched when the *E.* work is unsuitable to be 'held in the hand.' A square or rectangular frame is used for large and elaborate work, and a small circular frame of Chinese origin, called a 'tambour,' being used for small work. In the past, large pieces of *E.* were sometimes filled in with chain stitch worked with a crochet hook on material held in a circular frame, and this was known as 'Tambour work.' Three different kinds of needles are used in *E.*: crewel needles which are long and sharp and can be obtained in several sizes to suit varying thicknesses of thread; chenille needles which are shorter with large eyes and suitable for heavy work fixed to a frame; and tapestry or wool needles used for *E.* on loosely woven materials, such as canvas, net, and coarse linen, and also for whipping and lacing *E.* stitches. Good material for *E.* should be chosen as an artist selects his canvas; and the threads used should usually match the texture of the ground material, e.g., silk thread on a silk material, linen, cotton, or mercerised threads on a linen or cotton background, and wool on a woollen cloth except in the case of tapestry work on canvas, when silk or wool threads are generally used). Evenly made stitches, tone or colour effect, and design and arrangement all contribute to obtaining a pleasing result in *E.*

The prin. *E.* stitches are: *Running stitch* (single or double) which is used for outlines, etc.; *back stitch*, used in quilting or as a foundation for threading a self or contrasting colour, e.g. *Pekinese stitch* (frequently used in Chinese embroideries); *Stem stitch* is worked from left to right and is a kind of back stitch used in a variety of ways, such as outlines, fillings, etc.; *Herringbone* and *chevron stitches* are border or band stitches also worked from left to right; *looped stitches*, which are usually worked from left to right, include blanket stitch, crenan stitch, buttonhole stitch, feather stitch, chain stitch, and fly stitch, and these stitches can be used in a variety of ways; *flat or satin stitch* (also called Chinese flat stitch) is used in needle-painting by varying the length of the stitch and using a variety of shades and colours; *Knot stitches* include the single or Fr. knot, and the more elaborate *million stitch*. In Jap. *E.* the design is sometimes worked in knot stitched and outlined with gold thread; *Couching* is the laying down of a thick thread, cord, or several fine threads, along an outline and 'couching' down at regular intervals with a fine thread; *Cross stitch* should be worked on material which has an even

warp and weft which can be counted easily, and the crossing threads should always be worked in the same direction.

Darning E. is used as a decoration on huckaback towels, filling in, or background work, also on shadow work where some E. stitches are done on the back of a transparent material to form a 'shadow.' **Appliqué, or applied work,** is laying a motif over a piece of material and fixing it on with E. stitches. The motif should be cut on the same thread of material as the background to which it is to be attached, and it is buttonhole stitched, blanket stitched, couched or satin stitched into position: **Decoupé** is an inverse form of appliqué, i.e. the design is cut out of the material and a coloured patch inserted beneath it and stitches embroidered over the raw edges. **Smocking** is the use of E. stitches to hold in place fullness or width in a garment, particularly in children's dresses, overalls, etc., and is a traditional Eng. craft. **Eyeclets, scalloping, etc.,** are holes or edgings overcast or buttonhole stitched, used in *Broderie Anglaise*, or the *Richelieu* and *Renaissance* work which consists of a similar but more elaborate cut design held together by a series of bars worked in buttonhole stitch over several strands of thread. **Drawn thread** is the name given to every sort of needlework for which the drawing of threads (warp and/or weft) are the preliminary steps to the E. or interlacing of the loose threads of the material to form a pattern. **Tapestry** (of very ant. origin) is the name given to E. worked on counted threads. The stitches entirely cover the material, which is usually fine or coarse canvas, and the threads used being of silk or wool. Various stitches are used, such as cross stitch, *tent stitch* (i.e. a small single stitch taken across the warp and weft thread of the canvas), gobelin stitch, straight stitch, etc. **Needle weaving** is worked by drawing out threads of a material and darning a band in various coloured threads to make a squared design.

Quilting is the holding into position of two or three layers of material by the use of E. stitches—running or back stitch—worked to form a pattern or design. Machine stitches can also be used. Cotton wadding, lamb's wool, flannel, wool domette, or feathers, may be inserted between two layers of material which are stitched together by drawing a needle and thread through all three layers. This is known as Eng. Quilting and is used for bed covers, bed jackets, dressing gowns, etc. Soft materials with a sheen are most suitable for this work, as the emphasis on light and shade is part of its beauty. It. quilting has no wool filling, and the design is carried out in double outline through which a cord or thick thread is run, so emphasizing the design into a definite relief.

Patchwork is the use of odd scraps of material, preferably of uniform thickness and of the same kind, i.e. all cotton or all silk. The pieces may be cut into geometric shapes and oversewn together (backed with paper, which can be withdrawn later, they are easier to handle),

and sometimes finished off by outlining the joins with an E. stitch such as herringbone or feather stitch. Colour and design are important in this old-fashioned art.

Machine embroidery.—From the old hand-embroidery craft of Central Europe, and of Switzerland in particular, there developed machine chain-stitching and mechanical E. Chain-stitch E., carried out all over the world and on a notably large scale in India, can be produced by single-needle sewing-machines of the Singer type. Recent models are fitted with a vibrating needle which stitches a close zig-zag covering stitch of varying width as the work is moved under the needle. The early history of sewing and embroidery machines is closely connected. Neither machine could have developed without the principle of the double-ended needle with centrally-placed eye. Such needles were patented by C. F. Weisental in 1775 and by the Viennese tailor, Joseph Madersberger, in 1814. The first practicable mechanical E. frame with twenty double-ended needles simultaneously operated by a pantograph so as to reproduce the design traced by the master-pointer in the hand of the operator was built to the specifications of Joshua Hellmann of Mulhouse in Alsace. The needles were passed to and fro between two carriages each mounting twenty pinners and moving horizontally, one at the front and one at the rear of the frame which itself moved vertically. This hand-frame, the prototype of which was built in 1828 at Mulhouse, was improved so as to carry 170 needles and was brought into service in 1829 at the works of Franz Mange at St. Gall in Switzerland. Hellmann's patent frames were built by the firm of Saurer at St. Gall, a firm which is still in existence to-day. The use of these frames spread to the neighbouring Austrian prov. of Vorarlberg, to Bohemia (notably Letovice near Brno), and to Saxony (Plauen), all before 1873. The first mechanical frames were used in England by the Manchester firm of Houldsworth, and in Scotland by Gibson Brothers of Glasgow. Other Eng. centres were Macclesfield and Nottingham. The first prov. E. works in the Russian Empire was opened at Kalish in Poland in 1880. Later factories were estab. at Vilna. Moscow had possessed an E. works since 1870. In contrast to these needle-frames, mechanical but hand-operated, the Swiss manufacturers also developed Schiffli ('shuttle') E. machines which were power-operated. The first steam-driven machine was produced by Illster of Winterthur in 1865 and an improved model by Saurer of St. Gall in 1876. This machine performed 35 stitches per minute. Later developments have consisted principally in the progressive lengthening of the frame. The large output possible from power machines has made the use of hand machines uneconomical and few of the 30,000 reported as in use in 1890 now remain in operation. See also *SAMPLES*. See *Elsie Moohrie, Simple Embroidery*, 1926, 1947; *Mary Thomas, Dictionary*

of *Embroidery Stitches*, 1934, 1948; Gladys Fry, *Embroidery and Needlework*, 1935; Rebecca Crompton, *Modern Design in Embroidery*, 1936; Louisa E. E. Judd-Morris, *An Introduction to Embroidery Stitches*, 1948; and Dryad Leaflets on Embroidered Dresses for Children, Smocking, Cross-stitch, Needle Weaving Embroidery, and Embroidery Flowers.

Embrun, fort. tn. in the Fr. dept. of Hautes Alpes. It stands on a rock platform on the R. Durance. Pop. 2700.

Embryology, study of the development of the living organism, or of the formation of a new individual or embryo from an ovum. As such it is a branch of the science of biology. For a hist. of the rise of the science of embryology and for a general view of it, see **BIOLOGY**. In the higher plants and animals the cell (*q.v.*) is a highly complex structure, and the greatest complexity of functions and changes takes place in the *nucleus* of the cell. Within the cell of an animal and of certain plants is the *centrosome*, which is neither part of the protoplasm nor of the nucleus. This centrosome begins the process of cell div. by itself dividing into two parts. Afterwards the nucleus also splits, and then the whole cell divides. The nucleus contains a number of threads, the *chromosomes*, which become visible during cell division, and the number of these is constant for any given species. In the higher types of animals and plants the individual is composed of myriads of cells united together into tissues and organs and so into the organism. The original cell from which these were formed by successive divisions is described as the ovum or egg, and in the higher animals and plants this must be fertilised to enable it to develop. In the lower plants and animals, particularly in some insects, the natural development of unfertilised ova is not infrequent, and in others a physical stimulus may initiate development (see **EXPERIMENTAL EMBRYOLOGY**). Such development is said to be parthenogenetic.

In the higher animals, some of the earliest cells formed by the div. of the ovum constitute the germ cells of the new animal. This fact led to the theory of the continuity of the germ plasma (see **BIOLOGY**), but this theory is not applicable to the germ cells of plants or of many lower animals. Germ cells of the female are ova; those of male animals are spermatozoa, and of plants spermatozooids (except those of flowering plants, which are non-motile male gametes, as described below). Fertilisation is the union of an ovum and sperm, and takes place in the body of the female of higher animals and in the ovules of plants. Many lower aquatic animals and plants, and even many fishes, liberate the ova and sperms in the water, where they unite. The eggs of frogs are fertilised externally, the male adding spermatozoa as the ova appear.

Spermatozoa are usually some of the smallest animal cells, and are very active. Each has a 'head' consisting of the nucleus surrounded by a thin film of

cytoplasm and connected by a 'middle piece' with the 'tail,' or flagellum, a fine hair-like part which by its movement propels the sperm along, tail first. The flowering plants, with the exception of some Gymnosperms, have no motile spermatozooids, and the function of these is performed by a nucleus and small amount of cytoplasm formed in the pollen grain. This sends out a tube which penetrates the ovule and conveys the fertilising nucleus to the ovum.

Generally, compared with the sperms, and even with other cells of the organism, the ova, are large and laden with food material, the yolk, but some organisms have small ova with the food supply deposited in cells around them.

In the formation of the ovum, the mother cell, or oocyte, divides first into two unequal cells: the smaller of these is the first polar body, and is usually extruded. The other, the secondary oocyte, divides, forming the ovum and the second polar body, and this, too, is usually extruded. During the first div. the chromosome number is halved (see **CELL**), and fertilisation restores the full number of chromosomes. In parthenogenetic development, the full complement of chromosomes is sometimes gained by the fusion of an egg with a polar body, or by failure to reduce the number of chromosomes in the div. of the oocyte. Very occasionally, individuals with the single number of chromosomes develop and are usually abnormal. The spermatozoa are developed from spermatocytes in the testis of the animal. Each spermatocyte divides twice, forming four spermatozoa, and the first div. like that of an oocyte, reduces the chromosome number to half. Although sometimes several sperms may enter the cytoplasm, the nucleus of only one fuses with that of the ovum. The two nuclei fuse completely, losing their individuality, and in the subsequent divs. each nucleus may be regarded as derived half from the nucleus of the sperm and half from that of the ovum. Soon after fertilisation has taken place the cell begins to subdivide. The methods of div. of the fertilised ovum of an animal depend upon the quantity and disposition of the yolk. Where there is only a small amount of yolk, as in Amphioxus or mammals, the ovum divides to form a sphere of cells. In those cases where there is a large amount of yolk collected at one pole of the ovum, as in the frog, the cells form more quickly and are much smaller at the other pole, giving an unequal div. If the result of segmentation is a ball of cells, giving a hollow sphere, it is called a blastula; if it is a solid ball of cells, a morula, and if partial, so giving a disc of cells, it is known as a blastoderm. The next stage results in the formation of a gastrula. Usually the blastula becomes invaginated, one hemisphere sinking into the other, giving rise to a two-walled sac with the opening known as a blastopore. In the higher animals a middle layer, the mesoderm, is formed between the outer layer (ectoderm) and the inner one (endoderm).

The ectoderm forms the epidermis, the nervous system, the lens of the eye, and certain glands; the endoderm lines the midgut and its outgrowths; and the mesoderm forms the muscle, the skeleton, most of the viscera, blood and lymph vessels, blood, connective tissue, and certain membranes. See also EXPERIMENTAL EMBRYOLOGY. For the further facts of recapitulation and continuity of germ plasma, see BIOLOGY.

Emden, seaport and the chief tn. of E. Friesland, Germany. It is situated near the junction of the Ems with the Dollart, and is surrounded by walls and moats. It has a very Dutch-like appearance, intersected as it is by canals crossed by a great number of bridges. The old tn. is enclosed by walls, bastions, and moats. E. is by canal an outlet for the Rhenish-Westphalian industrial region. There is shipbuilding, shipping trade in corn, cattle, cheese, and smelting. E. was frequently bombed in the Second World War, and the tn. was wrecked. The tn. hall (1576), the Great Church (a Gothic building of the twelfth century), the Ostrfriesisches Landesmuseum and the Nordseemuseum were destroyed. Archives of the church and the collections of the museums, however, were stored in safety elsewhere. Pop. 34,100.

'**Emden**,' Ger. raiding cruiser, which had a notable career during the First World War under the command of Captain von Müller. At the outbreak of the war the *Emden* was in E. waters, and within a few days joined Adm. von Spee's fleet at Tsingtau. At Müller's request she was given a roving commission. In order to obscure her identity the *Emden*, which had only three funnels, put up a dummy fourth funnel, which made her resemble, at a distance, a Brit. warship. She made towards Indian waters, reaching the Bay of Bengal in the first week of Sept. 1914. Her first capture was a Gk. steamer, *Pontopporos*, carrying Indian coal to a Brit. port: this occurred on Sept. 10. Other successes came quickly, as many as six vessels being prepared for sinking at the same time. The procedure followed by Müller was to transfer from these ships to his own the articles he required, to tranship their personnel to the *Pontopporos* and then to sink their vessel. On Sept. 18 the *Emden* bombarded Madras and set fire to the oil tanks. Such a career could not be allowed to continue for long, and soon an organised search was made for the *Emden* by ships of Britain, France, Japan, and Russia. On Oct. 28 she sank a Russian cruiser in Penang harbour and also a Fr. ship which attacked her. She was eventually sunk off the Cocos Islands by the Australian cruiser *Sydney* on Nov. 9, 1914. There was nothing particularly brilliant in her career, for she generally hit unarmed ships or those which were no match for her armament, and when she did eventually meet a ship on more equal terms she was outclassed. Her captain and crew, however, behaved chivalrously towards the captured personnel. Similar tactics were pursued by the Ger. pocket battleship *Graf Spee* in the Second World

War (1939) the ship being defeated by three small cruisers off Monte Video in Dec. 1939 and soon afterwards scuttled by its crew.

Emerald, a precious stone belonging to the beryl species, its green colour alone differentiating it from the other beryls. It occurs as six-sided prismatic crystals of the hexagonal system, is transparent or translucent, has an uneven conchoidal fracture, a vitreous lustre, becomes much harder on exposure to air following extraction from the mine, and is rendered electric by friction. Oxide of chromium is supposed to give it its green colour. The E. is cut on a copper wheel with emery. The finest stones are found in Muzo, Colombia, and there are mines also in Siberia, at Henbachthal, and at Canjargun in India. The E. was greatly valued by the ancients, who invested it with talismanic and medicinal properties; it was supposed to be good for the eyes, and Nero, among others, wore E. eye-glasses.

Emerald Copper Ore, see DIORITE.

Emeritus, term applied, among the Romans, to a soldier who had served out his time; now extended to designate any one (especially a professor) who has retired from office on account of old age or infirmity.

Emerson, Ralph Waldo (1803-82), lecturer, essayist, and poet, born at Boston, U.S.A., son of a Unitarian minister; educated at Boston Lat. School and Harvard Univ.; was ordained in 1829, but resigned three years later as a protest against the administration of the Lords' Supper. In 1833 he first visited Europe, and met Landor, Carlyle, and others. His friendship with Carlyle lasted all his life and resulted in an exchange of notable letters. The following year he began in real earnest his life of lecturer and writer, and at once established his position as a leader of the New England transcendentalists, although he disclaimed sympathy with their school of philosophy at large. He worked side by side with Bronson Alcott, Margaret Fuller, Channing, and Thoreau, but in a broader spirit; and with them he developed transcendentalism, particularly in its theological aspect, as a protest against dogmatic rationalism in religion. His attitude in philosophy was strongly influenced by Platonism, the Ger. idealisms of Hegel, Fichte, and Schelling, and the Fr. idealisms of Cousin and de Staël, resulting finally in an indefinite conception of the God-like nature of the human soul and the correlation of human and divine wisdom, which may be described as a vague but inspiring pantheism. Of his innumerable lectures, the courses delivered at Boston during 1835 and 1836 on *Representative Men* and *The Philosophy of History* were perhaps the most noteworthy. His prose works are for the most part extensions and revisions of his lectures, and show in an even more marked degree his truly transcendental lack of purely logical coherence, as might well be expected when his method of working is considered. E. was wholly an intuitionist, and recorded his impressions and flashes of inspiration as they occurred to

him, subsequently synthesising them under such headings as seemed conveniently comprehensive. As a result of this, it may be observed in his writings that thoughts and criticisms have been too often distorted, merely to fit their expression into an epigram. E. himself confessed that 'I do not know what arguments mean, in reference to any expression of a thought.' His writings betray a complete absence of that symphonic style which is indispensable to a philosophy pure and simple, and they are, moreover, full of self-contradictions. These contradictions are not the result of any



R. W. EMERSON

After a crayon drawing by Samuel Row-

systematic evolution within the author's mind; they are rather the spontaneous interpretations, but in different moods, of the same mental experience. Each idea is complete in itself, rather than concatenated with its context. His work thus resolves itself into the expression of a personality which is governed by emotion, not by reason. And it is this predominant characteristic of E. which, however derogatory it may be to his work as pure philosophy, gives to it the charm of geniality, warmth, and confidence which is the secret of his undoubted attraction. As a theorist, devoted to the study of the higher instincts and their spiritual significance, and living out of touch with reality, he was an anomaly. For instance, he praised freedom, yet was slow to lend his support to a specific abolitionist movement against Amer. slavery. And he preached always the 'infinitude of man'; he loved the 'human idea,' but his admiration for the unit, physical man, was by no means excessive. By reason of his

singular elevation of character and sentiment, E. was essentially a poet. It is in his poetry that the true E. is most clearly delineated; yet, in spite of his eloquent pages on rhythm in *Poetry and Imagination*, it must be confessed that his verses are often far from musical. One can quarrel, however, only with his incomplete mastery of form and technique. Whatever the faults of his outward expression—the rough metre and forced simile of his poetry, or the inconsequence of his prose—the inner ideas of his writings are always lofty of conception, and in their own way frequently of rare beauty. E. was a real prose-poet of a high order, and by the beauty of his thoughts, the terse eloquence of their expression, and the broad spirit of optimism in his works, has gained his wide recognition and popularity. E. has been recognised by Amers. and by sound European critics as one of the greatest of the writers of his country. His essays have become Amer. classics and have had a profound influence in their own country. In spite of some roughness of form, his poems have caused him to be recognised as one of the most original poetic voices of the U.S.A. Unlike Europeanised poets like Longfellow, he turned to his own country, its own fauna and flora, for subjects for his lyrics. His extended stay in England gave him the opportunity to write his *English Traits* (1882), still one of the best books ever written on the subject. The Eng., according to E., concentrated all their attention on productivity—an observation which seems curiously topical to-day—but this exclusive attention to mechanical things, in E.'s opinion, had its drawbacks; for where 'the whole bias of the nation is a passion for utility,' man is sacrificed to the demands of the machine. Even worse was the apparent neglect of the higher things of life—the Eng., he says, are 'materialist, economical, mercantile' and 'their mind is in a state of arrested development.' Because of their preoccupation with money, E. concluded that the Eng. were its slaves and dupes. In spite of all this, E. had to admit that 'if there be one successful country in the universe for the millennium, that country is England.' All the world, he observed, imitated England, read its books, saw its plays, bought its newspapers and helplessly envied its luxury. Yet E. was aware that success did not necessarily lead to popularity: the national 'habit to brag' stood in the way, so that the Eng. traveller abroad, with his disdain of the rest of mankind, is a proverb for uncomfortable and offensive manners. To-day this portrait of the Eng. is hardly exact, even if it ever was; and indeed the characteristics which E. saw in the Victorians and which, ironically enough, we see or fancy we see to-day in the Amers., are merely the externals of leadership or the cloak worn by the most wealthy, most envied and most powerful nation in the world. His chief works are: *Nature* (1836), *The American Scholar* (1837), *Literary Ethics* (1838), *Poems* (1847), *Essays on Representative Man* (1849), *The*

Conduct of Life (1860), *Society and Solitude* (1870), *Journals* (1912). See lives by J. E. Cabot, 1887; V. Wyck Brooks, 1932; H. Hawthorne, 1935; E. L. Masters, 1948; and B. Perry, *Emerson Today*, 1931.

Emerson, William (1701-82). Eng. mathematician who, failing in an attempt to follow his father's profession of schoolmaster, near Darlington, lived in retirement, pursuing his favourite studies of mathematics and mechanics. He was eccentric, but possessed of rare intelligence and energy. His chief works are: *Method of Increments* (1763), *Mechanics* (1767), and *Doctrine of Fluxions* (1799).

Emery, an impure variety of crystalline corundum (Al_2O_3), being mixed with oxides of iron and silica. It was originally obtained from Cape Eméri in the is. of Naxos, but is now largely worked in various parts of Asia Minor and near Philadelphia, U.S.A. The very finest particles are obtained by elutriation, i.e. the finely powdered material is stirred up with water, and, after standing for some time, the top layer is run off and the very fine particles allowed to settle slowly. E. is a purple-black solid, next in hardness to diamond, and is largely used as an abrasive and polishing agent, for cutting and grinding glass, metals, and certain gems. E. wheels are made by mixing the powdered E. with some blinding material and subjecting the mixture to heat and pressure. E. paper and cloth are made by dusting the powder over the material which has been coated with glue. Pure corundum and the artificial "carborundum" (SiC) are now largely prepared, and have superseded E. to a certain extent.

Emery, Isabel Winifred Maud (Mrs. Cyril Maude) (1862-1924). Eng. actress, b. in Manchester, the daughter and granddaughter of actors. At fifteen she appeared for the first time in London at the Princess's Theatre. In 1881 she became a member of Henry Irving's Lyceum company, understudying Ellen Terry and playing her own parts; she toured twice with this company in America. She married Cyril Maude in 1888. From 1896 to 1902 she played at the Haymarket. After an interval of three years, during which ill-health caused her to be absent from the stage, she reappeared at His Majesty's. She appeared as Beatrice to Tree's Benedick, and she took *Olivia* on tour, and also played in H. A. Vachell's *Her Son*. She appeared in a charity performance in 1915.

Emesa (Syria), see **HEMS**.

Emetic, agent that produces vomiting. The origin of the word dates back to antiquity, and in the days of the Romans not only was it a regular accompaniment of a banquet but it was an intrinsic part of daily life. Es. are often replaced by the stomach tube or hypodermic syringe. The Es. most commonly in use are: copious draughts of warm water, mustard and water, or common salt and water, and are useful in cases of poisoning.

Emeu, see **EMU**.

Emigration, the act of leaving one country in order to settle in another. In

the early ages such a process was carried on by whole nations, who, having exhausted the fertility of their own lands, sought to acquire fresh habitats by conquest. Nowadays it is more of an individual process, and is determined by the greater prospects of material benefit offered by life in the destined country. E., therefore, usually takes place in the older countries, whose sons are lured away to younger lands. It first assumed notable proportions in the nineteenth century, when America was the chief goal. The greatest exodus was from Ireland, and the total number of emigrants from that country between May 1, 1851, and Dec. 31, 1910, was 4,187,443, leaving the country far less thickly populated than heretofore. Usually E. does not alter the social condition of the country of origin, though the loss of the more ambitious units is necessarily felt. In many European countries, however, emigrants have been actuated by a desire to escape from tyrannical political institutions, notably the Huguenots who left France at the end of the seventeenth century; and Germans and Austrians, most of them Jews, who emigrated in the years preceding the Second World War.

It was at the close of the Napoleonic wars that E. from Great Britain to the colonies overseas was promoted as a remedy for distress and unemployment. The pop. was then mainly agric., and state-aided E. was advocated as a channel for the redundant labour in the Brit. Isles, the more so as much of the land in the colonies was under the control of the home gov. Opinion was, however, divided over the application of the suggested remedy. William Horton, who was under-secretary for war and the colonies in 1822, advocated state-aided and mass E. of able-bodied workers, who were to be given free passages and free grants of 100 acs. of land in the colonies, free farming implements and a year's provisions. Edward Gibbon Wakefield (*q.v.*), the more celebrated protagonist, held that the pauper type of emigrant was unsuited to conditions overseas, and he therefore evolved a system of state-aided E., the cardinal features of which were that (1) emigrants should pay a sufficient price for land (about £2 an ac.); (2) the proceeds of sales in the colonies should be used as an E. fund to assist more labourers to emigrate; (3) emigrants should be judiciously selected; (4) E. should be controlled by a central authority; and (5) the colonies should become self-governing as soon as possible. In 1823 and 1825 Horton induced Parliament to try his scheme on a small scale. Later he secured an amendment of the Poor Law Act of 1834 to enable pars. to mortgage their poor rates so as to provide for their able-bodied paupers in the colonies, and during the ensuing few years a number of emigrants were assisted under that Act. But this plan lacked the vision behind the ideas of Wakefield, whose system of colonisation formed the basis of the gov. policy of settlement in S. Australia and New Zealand and generally

thereafter. About 1832 the gov. adopted the policy of assisting the E. of women, mechanics and agric. labourers, and in 1834 an Act was passed embodying Wakefield's principles with the view of settlement of S. Australia. In 1845 the Brit. Gov. set up the Colonial Land and Emigration Board, the original purpose of which was to take over the work of the S. Australian Commission appointed in 1835 for carrying out Wakefield's scheme. The Board's functions were extended to control the whole E. movement to the colonies and the sale in Great Britain of colonial land. Between 1840 and 1873 the Board granted free or reduced passages to over 352,000 settlers. But from 1850 onwards the general view began to gain ground that gov. supervision of E. was unnecessary. The colonists became self-governing, and assumed the control of their own lands; the prevalent opinion, led by the Manchester School of thought, was that the home gov. need take no further interest in Brit. persons who left the home country, and gradually the duties of the Board were absorbed by the Board of Trade, the Colonial Office and the Colonial legislatures. From 1878 till the First World War the gov. took little part in E. beyond subsidising a small office known as the Emigrants' Information Office (see OVERSEA SETTLEMENTS DEPARTMENT), estab. in 1886, which gave information to those wishing to emigrate whether to the colonies or to foreign countries. The number of Brit. emigrants rose from 227,542 in 1880, to 454,527 in 1911. Their prin. destinations were Canada, U.S.A., Australia, New Zealand, and S. Africa, in the order named. By 1912, however, attention began to be attracted to the importance of Empire development and the need for a better distribution of the white pop. within the Empire. The Brit. Gov., through the Overseas Settlement Committee, pursued a vigorous policy of E., through the medium of assisted passages to the Dominions, in the twelve years immediately following the First World War, but in the ensuing world economic depression E. fell away and in the next decade more people returned from the overseas Empire to Britain than emigrated from Britain to the overseas Empire. Australia made new immigration plans after the Second World War. The Federal Gov. held itself responsible for the recruiting, medical examination, selection and transportation of all Brit. migrants brought to Australia under the assisted and free passage schemes, and also for the placing of the migrants in employment. Arrangements were made whereby Brit. service personnel were encouraged to stay in Australia after their discharge—an opportunity later extended to members of the Brit. forces in India, the Middle E., and the Far E. (see also under EMPIRE SETTLEMENT ACT). A reversal of America's quota limitation policy was entered on by Argentina in 1946 when, moved partly by humanitarian and partly by practical motives, she opened her doors to European immigration on a scale rivaling the great Sp.

immigrations of half a century ago. The Foreign Minister declared Argentina's willingness to receive no fewer than 4,000,000 Europeans, beginning with 30,000 a month. The appointment of Father Jose Silva, with the rank of Ambas. Extraordinary and Minister Plenipotentiary to estab. his headquarters in Rome to select immigrants of It., Fr., Sp., Ger., and other nationalities, was regarded as evidence of President Peron's desire to strengthen his relations with the Rom. Catholic Church, which, together with the Army and the workers, was one of the three pillars of the Peronista regime. See also EMPIRE SETTLEMENT ACT. See C. W. Baird, *History of the Huguenot Emigration to America*, 1885; J. W. Gregory, *Human Migration and the Future*, 1928; W. A. Carrothers, *Emigration from the British Isles*, 1929; E. M. Kulischer, *The Displacement of Population in Europe*, 1943.

Emigration Societies. Several organisations exist for the purpose of aiding various classes of persons to emigrate to Brit. dominions and colonies in normal times. The chief among them are: *Salvation Army* (Head office: Migration House, 3 Upper Thames Street, London), provides farm training for boys, and finds situations overseas for boys, domesticated women, adult farm-workers and others. *Church of England Council of Empire Settlement* (8 Prince's Street, London, S.W.1), represents the Church as a whole in all matters relating to empire settlement. *Young Men's Christian Association* (Migration Department), (Kingsway House, 103 Kingsway, London, W.C.), co-operates with the Churches in Canada and Australia in settlement work. *The Society for the Oversea Settlement of British Women* (Sanctuary Buildings, Great Smith Street, London, S.W.1), acts as the Women's Branch of the Overseas Settlement Department and is an amalgamation of the prin. women's emigration societies. Other societies or agencies which are concerned, *inter alia*, with E. are the Brit. Dominions Emigration Society (34 Newark Street, Stepney, London, E.); Brit. Legion (*q.v.*); Dr. Barnardo's Homes (*q.v.*); Catholic Emigration Society; Middlemore Emigration Homes (Birmingham); National Association of Boys' Clubs; Scottish Council for Women's Trades; and the Fellowship of the Maple Leaf (for migrating teachers to the W. prov. of Canada and to Australia); and the 1820 Memorial Settlers' Association (for migrants to S. Africa).

Emigrés, the name applied to those who, remaining faithful to the royal house, left France on account of the Revolution. On the fall of the Bastille, July 14, 1789, the princes of the royal family, followed by many nobles, officers, monks, and priests, quitted France, the princes with their close adherents forming a court at Coblenz, others settling in Germany, Belgium, Italy, Holland, and Switzerland. Numbers of the E. served in the Prussian army against France. Their estates were forfeited and severe laws were passed against them. Many did not return to

France till after Napoleon's downfall, though granted an amnesty when he became First Consul. They were not able to recover their possessions. The term is also applied to White Russians who found shelter in France after the Russian revolution.

Emilia-Romagna, region of Italy, bounded by Lombardy, the Adriatic, the Marches and Tuscany, and Piedmont and Liguria. It included the modern provs. of Parma, Piacenza, Modena, Reggio, Ferrara, Forlì, and Ravenna. The Via Emilia is a Rom. highway forming, with the Via Flaminia, part of the great road from Rome. Area, 8548 sq. m.; pop. 3,488,000.

Eminence, title conferred on cardinals by Pope Urban VIII. (1631). They had previously been *Most Illustrious*.

Eminent Domain, the *dominium eminens* of the law, a phrase denoting the universal right in the public over property. In accordance with this law the gov. may compel a private individual to give up, on receipt of compensation, property required for the public good.

Emin Pasha (1840-92), name adopted by Edward Isaac Schnitzer, scientist and administrator, b. at Oppeln. His parents were Jews of Silesia, where his father was a merchant. He studied medicine at Breslau Univ. and graduated at Berlin. He then went to Turkey and received an appointment on the staff of Hakkı Pasha at Scutari, taking a Turkish name and adopting the dress and customs of the Turks in order to identify himself as nearly as possible with those among whom he worked. In 1865 he became a convert to Islam. In 1875 he went to Egypt, where he worked under the name of Dr. Emin Effendi. Gen. Gordon appointed him in 1878 medical officer and later governor-general of the Equatorial Prov. Gordon employed him on many diplomatic missions, his extraordinary power as a linguist, together with his wonderful tact, making his services invaluable. From the abandonment of the Sudan by Egypt until the arrival of Stanley's relief expedition (1899) he held and administered this dist. single-handed. He reluctantly left with Stanley, but later returned to Central Africa in the service of Germany. He was killed by Manyema Arabs. He had abolished the slave trade in his prov., studied its flora and fauna, made route surveys of over 4000 m., pursued meteorological investigations which resulted in the estab. of Lado as the E. Equatorial standard, and made vocabularies of many African dialects. E. may be regarded as one of the pioneers of the modern science of tropical medicine. He found (according to Stanley's record) that the use of mosquito netting of a certain mesh excluded the 'miasma' of malaria, and himself kept free of fever—twenty years before Manson and Ross discovered that 'miasma' was the *Anopheles* mosquito carrying the germ of malaria. His diary, ed. by F. Stuhlmann, was pub. 1916-23. See M. Jephson and H. M. Stanley, *In Darkest Africa*; *Quest and Rescue of Emin*, 1890, and lives by E. W. Frossler, 1925;

A. Symons, 1928; and Olivia Manning, 1947.

Eminescu, Mihail, Rumanian poet, was b. at Ipatesti. Son of a farmer. Went to the Univ. of Jena and Vienna, and later completed his studies at Berlin, specialising in philosophy. During a short period he was a teacher, and was then appointed to a post in the national library at Jassy. Later, he became editor of *Timputul*, the conservative paper of Bucharest. In 1883 symptoms of madness developed. He was discharged as cured, but was returned later, and was killed by a fellow-madman in June 1889. As a poet he was largely influenced by the popular songs of his country, but his own verse was filled with a bitter melancholy. The revolutionary cry of his *Emperor and Proletarian*, the concise beauty of his sad sonnets, the patriotic ardour of *Epigones*, in which he presents a virile fresco of ant. times, and his bitter sentiment toward women in his *Evening Star* are his best-known poems. He left also some brief sensual poems which remind one of Heine—*Desire, Blue Flower, Oh Remain!* His short story *The Poor Dionise*, is one of the masterpieces of the literature of his country. An Eng. trans. of selective *Poems* was pub. in 1930. See F. Long, *Eminescu als Dichter und Denker*, 1928.

Emir, Ameer, Amir (Arab *Amir*, chief or lord), Turkish title instituted A.D. 650 by Fatima, daughter of Mohammed, and bestowed upon the califs, descendants of the Prophet who called themselves Emir-al-Mumenin, 'chief or commander of the faithful.' They alone were allowed to wear the green turban. The title has been assumed by tribal chiefs in the E. and in Africa. Until 1916 the best known was the E. of Transjordan, but in that year the E. Abdullah el Hussein assumed the title of king.

Emmanuel, see IMMANUEL.

Emmanuel College, Cambridge. A college founded in 1584 by Sir Walter Mildmay as a Puritan institution in connection with Cambridge, on the site of a Dominican friary. The foundation consists of a master, sixteen fellows, and thirty scholars. Extra scholarships on other foundations are awarded by preference to pupils of Uppingham and other midland schools. The greater part of the present building dates from the second half of the eighteenth century. The chapel was designed by Sir Christopher Wren (1677). Richard Holdsworth, Gresham prof., and William Saneroff, archbishop of Canterbury, were masters of Emmanuel. Bishops Joseph Hall and Thomas Percy, Sir W. Temple, Dr. Samuel Parr, and John Harvard (after whom the college in America was named in 1638, in recognition of his services to Amer. education) all studied at Emmanuel. There is a fine picture-gallery attached to the master's lodge, and the library contains valuable MSS.

Emmaus, vil. of Judea, not identical with the present E., but possibly situated in the valley of the Urfa, 7 m. from Jerusalem, where remains of important baths have been discovered. Josephus

says that E. means 'warm bath.' Here Jesus appeared to two disciples on Easter Day (Luke xxiv.). The site may be the present Kubebe, or Amwas.

Emmenagogues, see MATERIA MEDICA.

Emmendingen, tn. of Baden, Germany, on the Elz, 9 m. N.N.W. of Freiburg.

Emmental, valley of the R. Emmen, one of the finest of Switzerland, in the canton of Berne. Famous for its cheese.

Emmerich, walled tn. of the Rhineland, Germany, situated on the Rhine, 49 m. N.N.W. of Dusseldorf, and near the Dutch frontier, 94 m. E. of Rotterdam, and of very Dutch appearance with extensive riv. trade. St. Willibrord, an Eng. missionary, is said to have founded a church here in 697. It is noted for manuf. of oils, fats, machines, paper, chemicals, leather and sausages. In the Second World War operations of March, 1945, for crossing the Rhine the Canadian Army held the line of the Rhine and Maas from E. westward to the sea to insure the security of the bridgehead over the Rhine at Nijmegen and guard the Scheldt estuary. The fifteenth century Adlungskirche and the Martinkirche (in part eleventh and twelfth century) were completely destroyed in battle. Pop. 13,600.

Emmet, see ANT.

Emmet, Robert (1778-1803), patriot, distinguished himself at Trinity College, Dublin, by his brilliant oratory. As a protest against the visitation of Lord Clare and Dr. Duigenan in 1798 to investigate the political tendencies of the students, he withdrew his name from the books. Like his brother, Thomas Addis E., he was an enthusiastic United Irishman, and after a visit to Paris in 1802, where he interviewed Napoleon and Talleyrand, he engineered a rising in Ireland. The idea was to seize Dublin Castle, and to hold the lord-lieutenant as a hostage; but the insurrection was ill-planned. Only a small body of revolutionaries assembled, and those committed such crimes of violence that E., broken-hearted, fled. He was captured, tried, found guilty and hanged. The poignant story of his love for Sarah Curran has been told by John Brophy in his novel *Sarah* (1948).

Emmloh, Otto A. T. Von (1848-1915), Ger. general; was early prominent in the First World War through being in command of the force that successfully besieged Liège in Belgium. In 1915 he went to the E. Front as a Corps Commander, and took a successful part in the battles of the Dunaev (q.v.) and the San. His corps was situated on the right of Mackensen's XI. Army; it distinguished itself particularly during the operations of May 2-5, 1915, when Mackensen broke through the Russian line between Gorlice and Tarnow.

Emmius, Ubbo (1547-1625), Dutch writer on chronology and hist., prof. of Gk. and of hist. at Liers, E. Frisia. He is best known as the author of the erudite work, *Vetus Grecia Illustrata*.

Emotions, term used in philosophy to indicate one of the three groups into

which mental phenomena may be divided. Thus we may say that the states of the mind may be classified under *knowing*, *feeling*, or *willing*. The first term includes such facts as perceiving, remembering, and reasoning, and they may further be said to be *intellectual* operations. The second term would include all pleasurable and painful conditions of the mind, whether simple, such as the distress of hunger, or complex, such as love; and it is this class of mental states which is indicated by the term *emotions*. The third term covers all active mental operations, e.g. walking, speaking, and also efforts to do things, active impulses, and resolutions. To cover all the phenomena of the third class, the term *willing* must be extended to cover random movements as well as voluntary actions and volitions.

Feeling marks any state of consciousness which is pleasurable or painful. Those effects which depend merely upon nerve stimulation, such as the pains of hunger and thirst, and their corresponding pleasures, and which are commonly marked as *sensations*, are included under the term E. as well as those effects which depend upon some amount of mental activity, such as fear, hope, regret, etc., which are known as K.

The correlation between the states of feeling and their physical accompaniments illustrates the close connection between mind and body. Facial movements, gestures, modifications of voice, and even internal organic effects are well known to accompany feeling. All feeling involves an excitation of nerve-centres, and diffuses itself over the nervous system in a circle of effects. The development and continuance of a feeling depend upon this cycle of effects. Expressive movements are partly instinctive—e.g. crying, frowning, etc., and appear early in life—and partly acquired. Imitation plays a big part, and it is easy to see how in this way we acquire actions expressive of enmity, moral displeasure, etc. Sometimes the will aids in the acquirement of these movements, as in the adoption of the conventional look, tone of voice, and gesture of the social circle moved in. Several theories have been advanced to explain these movements. It is generally agreed that all feeling tends to produce certain bodily effects which are proportionate in strength and range to the intensity and persistence of the feeling. Spencer showed that, as the feeling becomes more intense, so larger muscles are called into play, e.g. twitching of fingers, then movement of the arms, and so on as agitation increases. Wundt amplified this by saying that the motor centres of attention are involved, and the due regulation of thought disturbed. Violent E. of any kind illustrates this well. To account for the distinctive movements attached to the various feelings, Bain suggested that pleasure is connected with an increase, and pain with a decrease, in the vital energies, and so the expression of pleasure would have greater vigour of action than the expression of pain. But Sully shows that

strong and violent feelings, whether pleasurable or painful, have very like results, and that the strong contrast in energy between certain feelings, say anger and fear, does not coincide with a contrast of pleasure and pain. Therefore he suggests that it is connected with the feeling as energetic in character, or depressing and paralyzing.

Psychologists have tried to bring the varieties of pleasure and pain under certain laws. One or two of the principles they have formulated may be said to be approximately correct, and of some practical import. Thus they have formulated the law of stimulation or of exercise. We may say that all pleasure is connected with the exercise of some capability, faculty, or power of the mind; or that it is the accompaniment of some organ which is connected to the nerve centres, or the seat of conscious life. And, in general, moderate stimulation of an organ or exercise of a capability produces pleasure, and this pleasure increases with the strength of the stimulus to a certain point. Beyond that point the pleasure diminishes and passes into a painful effect, as with the blinding light of the sun, a very loud sound, or very great mental effort. Painful states of feeling may be caused by the absence of stimuli, as in the effect of darkness, the restlessness of a boy repressed, and those mental conditions like ennui, tedium, and dullness. Again, an obstruction to activity will cause painful effects, as when a train of thought is impeded by forgetfulness. Another principle rather less important is that of change or contrast. A pleasurable stimulation continuing to act may become painful, or even if this does not happen it may at least lose its pleasurable effect. Change, therefore, involves pleasure because it limits the duration of any stimulus, and because it is a necessary condition of that vivid active attention which is necessary—always provided that the change is not so violent that it causes shock.

Now, feelings may be divided into two divisions, those arising directly from a process of nervous stimulation or the excitation of sensory nerves, and those depending on some manner of mental activity. The first, which may be termed bodily feelings, involves processes in the outlying parts of the organism, and may be called *sense feelings*. The second, being connected with central nerve forces (the brain), may be called *E*. There is also a close correspondence between the instincts and the *E*. Thus the instinct of self-preservation gives rise to the *E*. of fear (*e.g.* in battle or when crossing a main road) and the instinct of self-perpetuation or reproduction gives rise to the *E*. of love.

Sense-feelings may arise from disturbances of some part of the organism, as in hunger, thirst, heat, and cold sensations, etc., and pleasures or pains connected with the excitation of special senses, and the pleasures or pains of muscular sensation, etc. The latter class are much more easy to distinguish and localise than the former. Further, painful feelings are more numerous than pleasurable ones in

the case of internal organic sensations, as in digestion, etc., while with the special sense the pleasurable are more prominent, and with the higher senses, hearing and sight, the pleasurable element is the greatest; and of these it may further be stated that they are closely connected with the mental feelings.

The general laws which apply to mental development also apply to the development of the *E*. They are deepened by exercise, and there is a progress from simple feelings to complex *E*. The growth of the *E*. cannot be fully explained as the result of individual experience. They arise uniformly when the appropriate circumstances occur, usually early in life, *e.g.* the child has a disposition to feel anger when he is annoyed or injured. On the other hand, an instinctive element enters into feelings which may be shown to be largely the result of individual experience. It may be noted that this instinctive capacity for any particular *E*. is not the same in all cases. These instinctive emotional tendencies can be explained by referring them to ancestral experience and allowing that there are transmitted associations.

The study of the development of the *E*. enables us to divide them roughly into three groups or orders, giving successive stages in the progress of the emotional life. First we get *individual* or *personal E*. which are confined to the individual and depend upon a more or less distinct personal reference. These grow up around self and self-activities, the pleasures of hope, success, reputation, etc., or they attach themselves to objects having a special personal relation, as in the child's love of its mother. Secondly, we have *Sympathetic E*., which involve participation in other people's experiences, and so are purely representative. They presuppose a certain amount of personal emotional experience, and are non-personal and common in direct contrast to individual *E*. Thirdly, we have the highly complex *E*. termed *sentiments*, viz. patriotism, love of humanity, etc. These may be subdivided into three classes: (a) *intellectual*, or the attachment to truth; (b) *aesthetic*, or admiration of the beautiful; and (c) *moral*, or reverence for duty, which includes love of humanity and the worship or moral excellence. All these *E*. involve a higher form of representativeness than sympathy, although they depend upon it to a very large extent, and they are entirely non-personal and common, turning the mind absolutely away from self to a disinterested contemplation of an object. See H. Spencer, *Principles of Psychology*, 1855; A. Bain, *The Emotions and the Will*, 1859; C. Darwin, *Expression of the Emotions in Man and Animals*, 1872; J. Sully, *Outlines of Psychology*, with *Special Reference to Education*, 1884; G. B. Phelan, *Feeling Experience and its Moralities*, 1925; C. G. Jung, *Psychologische Typen*, 1921; J. Macmurray, *Reason and Emotion*, 1935; J. P. Sartre, *Esquisse d'une théorie des Émotions*, 1939. See also CHILD STUDY; PHILOSOPHY; PSYCHOLOGY.

Empecinado, Don Juan Martín Díaz, el (1775-1825), Sp. patriot, a famous and redoubtable guerilla chief who harried the Fr. during the Peninsular War. He became field-marshal in the regular army, but, involving himself later in the insurrections of the Constitutionists, he was hanged. He incorporated his sobriquet *el empecinado* ('the pitch-coloured') with his name.

Empedocles, Gk. philosopher, law-giver, physician, poet, and high priest of Agrigento in Sicily, b. about 490 B.C. He analysed the universe into the *four elements*, fire, air, earth, and water, fire being the essence of life, the other elements forming the basis of matter. His system is founded on this theory together with another which supposes two opposing forces, Love and Hate. The world began when the elements, which had been torn asunder by the force of Hate, tended to come together again under the influence of Love. The different species arose out of the different minglings of the elements. His chief work was a sublime epic on Nature. See J. Burnet, *Early Greek Philosophy*, 1920.

Emperor, Title of. Among the Romans, *emperor* or *imperator* was the title borne by the commander of an army, then by the governors of provinces, then by the head of the Roman empire. In modern times it became the highest title of dignity and is assumed by several European sovereigns who ruled over a vast territory where dwelt people of more than one nationality. The rulers of Russia, Austria-Hungary and Germany before the First World War were called *emperors*. Queen Victoria assumed the title of *empress of India* in 1876.

Emperor Moth, name given to *Saturnia carpinii*, a species of Coleoptera, and is also applied to the whole family of Saturniidae. *S. carpinii*, which is also called *S. paronina*, is common in England, though rare in Scotland, and in the heather-districts the bright-green larvae, studded with red or yellow warts, may often be observed. Their general colour is greyish with purple and orange tinges, and they are remarkable for the eyespot common to both wings of both sexes.

Emphysema, an inflation; an abnormal presence of air. Medically, it consists of an enlargement of air vesicles of the lungs, which are the terminations of air passages. It occurs in bronchitis and other conditions where there is excessive coughing. It causes lessening of the aerating surface of the lung and shortness of breathing; in young lads, it may only give trouble on exertion, causing the broken wind of schoolboys. In older persons with chronic bronchitis, the chest becomes enlarged and barrel-shaped from decreased breathing in the lung requiring increased depth of breathing. Increased work is also thrown on the heart to drive the blood through the inflated lung; in time it fails to drive sufficient blood through, so that the heart's action is embarrassed, and the badly aerated blood causes the sufferer to look blue. The treatment of E. consists in attending to the underlying causes, the bronchitis or

asthma, and in maintaining heart action.

Surgical emphysema is due to air in the general connective tissues of the body, from injury of some air-passage or wound of the chest-wall, without injury to the lung. Only in severe cases is it necessary to make incisions to allow the air to escape; in ordinary cases respiration is not impeded, nor is the heart's action embarrassed.

Emphyteusis (Gk. *ἐμφυτεύσις*, a planting in) or **Jus Emphyteuticarium**, in ant. Rom. law, the right of enjoying all the fruits, and disposing at pleasure, of the *prædium* (estate) of another, subject to the payment of a yearly rent (*pensio* or *canon*) to the owner. Both lands and buildings could be subject to E. Though the *emphyteuta*, or person who enjoyed the right, could dispose of his rights as he pleased, the *dominus*, or owner of the land or building itself, had a right of pre-emption. The old right relating to *agri rectigales*—leases of lands held of the Rom. people, of municipalities, or of the college of priests, i.e. short or long lettings by the state—was, about the time of Justinian, united with that of *emphyteusis*. The J. E., though based on an institution of the civil law, only assumed its peculiar character in the time of the Lower Empire, whereas other and equally characteristic *servitudes* owed their existence to the praetors.

Empire, British, see BRITISH EMPIRE.

Empire Day, the celebration, throughout the Brit. Empire, of the anniversary of Queen Victoria's birthday, May 24. It has been officially recognised since 1902, when the earl of Meath inaugurated the festival as a means of training school children in good citizenship.

Empire, Eastern, see BYZANTINE EMPIRE.

Empire Marketing Board. An official executive body formed in 1926, following a recommendation of the Imperial Economic Committee, for the purpose of developing trade with the Empire. In scientific research the Board worked through existing scientific institutions which it assisted financially on the advice of various gov. organisations at home or overseas. In the stimulation of interest in the Empire and its development, the Board invoked all the paraphernalia of modern advertising. It advertised not only in the newspapers, but also by means of elaborate and artistic posters in its special poster frames; it arranged displays at exhibitions, organised lectures and displays of Empire films, and issued a number of pubs, dealing with various aspects of Empire marketing. The whole work of this Board was an interesting experiment in the application by an official, but not bureaucratic, organisation of the most modern methods of scientific research and publicity to some of the problems of Empire development. After the Ottawa Conference, when a series of inter-Imperial tariff agreements were concluded, the continued existence of the E. M. B. was rendered unnecessary and it was dissolved in 1933.

Empire Music Hall, formerly one of the chief London music halls, in Leicester Sq.,

W., estab. in 1887 and now converted into a cinema theatre. The Empire was particularly noted for its ballets and revues.

Empire Settlement Act. The Settlement Act of 1922 formed the basis of the present Brit. policy of state-aided Empire Settlement until the gradual suspension of the settlement after the economic depression of 1930-32. This Act empowers the Brit. gov. to co-operate in agreed schemes for assisting the migration of suitable persons in the United Kingdom who intend to settle in the overseas dominions. These schemes may be either development or land settlement schemes, or schemes facilitating settlement by help with passage money, training for life overseas, or otherwise; the contribution of the Brit. Gov. may not exceed half the expenses of the scheme, and their liability to contribution is limited to fifteen years as from May 31, 1922. The policy of overseas settlement was reconsidered at the Imperial Conference of 1930, and re-endorsed in a resolution which while recognising that the existing economic difficulties were such as to render impracticable any considerable flow of migrants, recommended that the govts. concerned should take such measures as might be best calculated to secure the paramount object—namely, the better distribution of the white pop. of the Empire, as and when economic conditions might permit.

The genesis of the policy of state-aided Empire Settlement is to be traced to the Report of the Dominions Royal Commission, appointed in 1909, to inquire into the development of the natural resources of the Empire (*Cmtl.* 8462). This Commission urged the need for more effective supervision and direction of migration by co-operation between the Home and Dominions Govts. The sequel was the appointment, at the end of 1918, of the Overseas Settlement Committee to advise the gov. on the subject. This Committee's recommendation led to a scheme in 1919 for state assistance in the form of free passages to ex-service men and women and their dependents who desired to settle elsewhere in the Empire. This scheme was terminated at the end of 1922, by which time free passages had been granted to over 80,000 persons. Opinions differ on the results of the Empire Settlement Act, though for several years after its passage large numbers of persons migrated to Canada, Australia, and New Zealand under the various schemes organised under the Act. Up to 1926, some 251,791 persons were assisted to travel overseas. The gross outward movement to the dominions in that period was about 130,000 a year, the number of assisted settlers being about 65,000 a year. In 1936 an Overseas Settlement Board was set up to advise the secretary of state for dominion affairs on specific proposals for schemes of emigration within the Empire. The more stringent regulations limiting present-day settlement demand a high standard of health, character and capital resources, while improved conditions at home, including the various insurance schemes for unemployment, health, etc.,

rather tend to discourage emigration. The Australian Commonwealth Gov., however, introduced health insurance legislation in 1938 and in other ways enhanced opportunities for limited categories of settlers. In 1946 a free passage scheme for ex-service men and women and their dependents was arranged between the United Kingdom Gov. and the Commonwealth of Australia. This agreement was entered into by the United Kingdom Gov. as part of its resettlement programme and the date of its commencement was contingent on the provision of shipping. An agreement for an Assisted Passage Scheme under the E. S. A. was also made in 1946 with Australia. The amount payable by approved migrants of nineteen years of age and over is £10 a head, the remainder of the cost being borne equally by the two govts. concerned. But subjects normally resident in the United Kingdom are eligible under this scheme, but assistance is given only to applicants approved by both govts. Single persons or married childless persons should not be over forty-five; married persons, if accompanied by one or more children, may be accepted up to fifty years of age, and with special cases of parents joining children already estab. in Australia, the age limit may be extended to sixty.

During the first two years after the Second World War over a million men and women in Britain, fired by expectations of a better life overseas, besieged the offices of the dominion High Commissioners in London, in the hope of making arrangements for emigrating. The dominions, for their part, responded with a change of heart from pre-1939 days. The Canadian Gov. opened immigration offices in Liverpool and Glasgow. Australia sent interviewing commissioners to employment exchanges throughout Britain and neither these two dominions nor S. Africa neglected European and other countries as possible sources of supply; for Canada opened immigration offices in Paris, Brussels and the Hague, while Australia instructed all her legations to receive applications, including those in such states as the U.S.A., Russia, and France. Much of this activity springs from a repulsion of that wish to get away from Europe which was so evident after the First World War and reached its peak in the 1920's. But this time the state of Europe is now (1948) such as to impel an even greater number of people than ever before to turn their eyes to other lands. Nor are the dominions alone in seeking fresh blood, for the Argentine gov. announced (1946) that it would take 4,000,000 Europeans at an eventual rate of 30,000 a month, while Brazil made proposals for a general intake of 120,000 It. immigrants annually up to 10,000,000. It may be that of the dominions, Australia is the country which in the long run will prove to have the most scope for development, but estimates of what the final pop. of that dominion may be should be viewed with considerable reserve. The Australians, of course, were naturally deeply

perturbed by the narrow margin by which they escaped a Jap. invasion, and therefore they want a larger pop. in the plainest interests of national defence. Neither New Zealand nor S. Rhodesia has yet opened a waiting list. In any case movement is bound to be slow. S. Africa announced the closure of immigration to citizens of the United Kingdom in 1918.

Empire State, *see* NEW YORK.

Empire State of the South, *see* GEORGIA.

Empirical Formula, in chemistry, the simplest formula for a substance in which the atoms of the various elements in the compound are shown in the correct ratio but not necessarily the correct numbers. Thus the empirical formula for grape-sugar is CH_2O but its true formula is $\text{C}_6\text{H}_{12}\text{O}_6$. In the case of most solids, only the empirical formulae are known, the true formula being indeterminate.

Empiricism (Gk. *empeiria*, trial, experience), philosophical term signifying a belief that actual sense-experience is the source of all ideas and excluding all possibility of *a priori* knowledge or conceptions. This view arose out of the system of Heraclitus, rejected by Socrates and Plato. It maintains that the mind at first is a *tabula rasa* (clean slate) upon which experience must write all impressions. The sophists of antiquity were empiricists. The scholastics taught that the mind can attain to true intellectual apprehension not by innate ideas but by concepts derived from sense-experience. Descartes' philosophy estab. a compromise, one part of knowledge being considered innate, another empirical or derived from outside. (*See* INNATE IDEAS.) Many Eng. thinkers have held empiricist views (Locke, Hume, John Stuart Mill). Locke made experience the basis of all knowledge, sensation, and reflection, while Berkeley and Hume developed this philosophy on different lines. This empiricism formed a strong contrast to the Cartesian 'rationalism' of the Continent. Its chief fault is perhaps that it gives a wrong account of experience, representing it as piecemeal, whereas the two elements of knowledge (*a posteriori* facts of experience, and *a priori* facts) are essentially and inseparably united, as Kant held in his philosophy. In medicine, the term empiric was applied to those who (in opposition to the Dogmatist and Methodist) drew their rules of practice from personal experience, disregarding the more scientific methods of inference and deduction and all philosophical theory. Hence the word came to mean an untrained practitioner, one who prescribed solely on individual observation and experiment, a quack-doctor. Empirical laws are those adopted merely because found (or supposed) to be beneficial and successful in practice, without any reason authorising them (as distinguished from 'casual' laws).

Employers' Liability, *see* WORKMEN'S COMPENSATION.

Employment Exchanges. These are local offices, at first called Labour Exchanges by the Labour Exchanges Act, 1909, estab. for the purpose of mobilising

labour, gathering information as to employers requiring workpeople, and, conversely, as to workpeople seeking employment, and, generally, enabling applicants for labour to obtain it. They are an antidote to unemployment borrowed from Germany, and in view of the success attending the experiment in that country, it is remarkable that they were not estab. in England before, though in this connection considerable good had been done by local distress committees under the Unemployed Workmen Act, 1905. The Act of 1909 empowers the Ministry of Labour (to which department the duties were transferred in 1917 from the Board of Trade) to set up and maintain E. E., wherever they think fit, and to assist any E. E. maintained by other authorities. The Act provided that the powers of any central body or distress committee, and of any local council acting through a special committee, to maintain employment registers under the Unemployed Workmen Act, 1905, might, after one year from the passing of the Act, only be exercised under the control and with the sanction of the Local Gov. Board (now Ministry of Health) and that that sanction should not be given except after consultation with the Board of Trade (now of the Ministry of Labour). The Ministry of Labour is empowered to make general regulations with respect to the management of E. E., and the expenses incidental to administering the Act are payable out of moneys provided by Parliament. The Act also provides that any person knowingly making false representations to any officer of an E. E. for the purpose of obtaining employment shall be liable to a fine not exceeding £10. The central office of the E. E. is at Queen Anne's Chambers, Westminster, S.W., the branch exchanges being classified into territorial divs., each with its office and clearing-house subject to the control of the Central Office. The Ministry of Labour is empowered to advance travelling expenses to applicants for work where work at a distance has actually been found for them, but such power is subject to restrictions in regard to trade union rates of wages and trade disputes. In 1929 there were about 1200 E. E. in the country. The duties of E. E. were considerably increased when they were extended to the scheme of unemployment insurance (*q.v.*) which was instituted in 1912. Ordinarily the payment of benefits is made at E. E., but in some cases trade unions and other associations of workpeople pay out the state benefits together with an additional sum provided out of their own funds. The trades which appear to benefit most by these institutions are building, transport, metal, machine and implement industries, agriculture, textiles and general commerce, while the temporary Christmas staff of the Post Office is largely recruited through this medium. Vacancies filled by women workers include indoor domestic work, clothing industries, agriculture and food and drink trades, while juvenile employment is also widely covered.

Table 1 shows vacancies notified at E. E., and the numbers of vacancies filled in the years 1913, 1918, 1923 and 1928. The Second World War had a marked

the registers of E. E. in Great Britain and Northern Ireland (including persons who were only temporarily suspended from work and unemployed casual workers, as

TABLE 1.—NUMBER OF VACANCIES NOTIFIED

Year	Men	Boys	Women	Girls	Total
1913 . .	714,270	143,715	270,325	94,518	1,222,828
1918 . .	977,999	148,153	808,490	132,570	2,067,217
1923 . .	604,298	82,539	288,824	84,632	1,060,293
1928 . .	775,792	180,560	419,211	160,678	1,536,241

NUMBER OF VACANCIES FILLED

Year	Men	Boys	Women	Girls	Total
1913 . .	566,150	90,387	199,395	65,921	921,853
1918 . .	669,732	122,054	624,220	98,906	1,514,712
1923 . .	554,998	73,119	211,984	75,141	917,242
1928 . .	729,140	149,312	339,967	133,009	1,351,428

effect in solving the intractable unemployment problem which had been so marked a feature of the inter-war decades. This is evident from the statistics pub. in the *Ministry of Labour Gazette*: the reduc-

well as those wholly unemployed) fell from approximately 774,900 at Dec. 9, 1940, to 216,500 at Dec. 8, 1941. Table 2 show unemployment totals in selected months in 1942:

TABLE 2
WHOLLY UNEMPLOYED

Month	Men 18 years and over	Boys 14-17	Women 18 years and over	Girls 14-17	Total
Jan. . .	71,684	13,066	65,373	15,799	165,922
June . .	59,910	9,324	36,057	8,384	113,679
Dec. . .	57,453	7,987	27,072	6,880	99,392

TEMPORARILY STOPPED AND UNEMPLOYED CASUAL WORKERS

	Men	Boys	Women	Girls	Total
Jan. . .	17,933	109	10,515	615	29,172
June . .	6,100	41	4,200	193	10,534
Dec. . .	5,465	12	2,346	78	7,882

tion in unemployment, which was in progress during the greater part of 1940 continued uninterruptedly throughout 1941. The total number of persons on

Table 3 shows the figures for wholly unemployed in Jan. and Oct. 1943 and 1944 for Great Britain and the United Kingdom respectively:

TABLE 3

Great Britain						United Kingdom
	Men 18 years and over	Boys 14-17	Women 18 years and over	Girls 14-17	Total	Total
Jan. (1943) .	48,055	10,279	25,935	9,439	93,708	112,671
Oct. (1943) .	40,042	8,416	16,546	8,249	72,253	82,626
Jan. (1944) .	40,491	9,442	17,736	9,005	76,674	91,634
Oct. (1944) .	46,168	9,062	15,589	8,416	79,235	89,940

Table 4 gives the number of insured persons registered as unemployed in Great Britain in Jan., Oct., and Dec., 1945.

The increase shown in the table below was due to demobilisation; for between Dec. 31, 1944, and the end of Nov. 1945,

Insurance to July, 1923, and subsequent reports. For statistics of unemployment in later years, see the monthly issues of the Ministry of Labour Gazette. See also J. N. Webb, The Transient Unemployed, 1935; P. Cohen, Unemployment Insurance and Assistance in Britain, 1938.

TABLE 4

Month	Men 18 years and under 65	Boys 14 and under 18	Women 18 and under 60	Girls 14 and under 18	Total
Jan.	53,985	5,589	22,799	5,610	87,983
Oct.	124,098	7,734	93,829	7,665	233,326
Dec.	156,126	7,181	114,686	6,763	284,756

the numbers of men and women in the armed forces, auxiliary forces and civil defence services were reduced by 838,000 (from 5,195,000 to 4,357,000). The course of employment in industry during the same period was naturally also influenced mainly by the course of the war. The achievement of victory brought in its train three main developments: (i) some relaxation in the rate of withdrawal of men and women from industry for the forces and auxiliary services; (ii) the

Empoli, a tn. of Tuscany, Italy, on the Arno, in a beautiful and fertile dist. Manufs. linen. It was very flourishing in the Middle Ages. In the Second World War the bell-tower of the Collegiate church was blown up by the Gers. and, in its fall, destroyed the small museum. The Baptistery was also largely destroyed. Four large paintings by Empoli, Cigoli, Botticini and Macchietti were destroyed. Heavy damage was sustained by the church of S. Agostino. Pop. 5800.

TABLE 5

Great Britain					United Kingdom	
Year	Wholly unemployed, including casuals		Temporarily stopped		Total	Total
	Males	Females	Males	Females		
1939	931,332	258,088	137,192	78,347	1,407,959	1,480,324
* 1940	468,777	222,373	100,389	58,549	850,088	918,051
1941	135,320	89,756	29,275	27,476	291,827	330,675
† 1942	62,019	31,859	3,196	2,691	99,765	119,117
1943	47,191	20,574	795	733	69,293	85,538
1944	45,062	17,634	394	518	63,608	77,929
1945	86,273	53,004	549	534	140,410	159,977
1946 (June)	260,895	94,270	2,860	1,309	359,334	391,939

* From July 1940 the figures exclude men in attendance at Gov. Training Centres.

† The figures for 1942 and later years are exclusive of men and women classified as unsuitable for ordinary employment.

introduction of the scheme of demobilisation; and (iii) the acceleration of the process of reconversion from production for war purposes to production for civilian needs and the export trade.

Table 5 shows the average numbers of insured persons registered as unemployed in each of the years 1939 to 1945, and the numbers registered as unemployed in the middle of 1946.

For full information as to statistics, see the *Abstract of Labour Statistics of the United Kingdom*, issued before the First World War by the Board of Trade; for information on unemployment insurance the *Report on National Unemployment*

Emporia, city of Kansas, U.S.A., cap. of Lyon co., 53 m. S.S.W. of Topeka. It has railway shops and other industries and is the commercial centre for a large agric. and stock raising region. It is the seat of the Kansas State Teachers' College with 1800 students, and of the College of Emporia (Presbyterian). Pop. 13,100.

Empson (or Emson), Sir Richard, Eng. lawyer and statesman, was the son of a wealthy citizen of Towcester, Northamptonshire, and was trained for the Bar. Like Edmund Dudley, he was the unpopular agent of Henry VII., and was employed in exacting taxes and penalties due to the crown. He shared with Dudley

a reputation for harshness and tyranny in his exactions. In 1491 he became speaker of the House of Commons, and in 1504 chancellor of the duchy of Lancaster. In the second year of Henry VIII's reign, he and Edmund Dudley were both convicted of tyranny and constructive treason, and were beheaded on Tower Hill, London, on Aug. 17, 1510.

Empyæma (literally, pus in; meaning pus in the cavity of the pleura). This occurs in a late stage of pleurisy, pleurisy itself being inflammation of the pleura, which is the lining of the chest-wall and the covering of the lung. The term E. is also used for any collection of fluid in the pleural cavity, before an exploratory operation has been done to learn the nature of the fluid, whether serum, a clear fluid, or pus. Pleurisy and E. commence in the pleura, or extend from the chest-wall, as in growths, injuries, or disease of other parts, as the kidneys, or from the lung, as in tubercle, or the pleura and lung become diseased at the same time, as in pleuro-pneumonia. When pus is present, it must be removed by aspiration, that is, drawing it off. If the underlying cause remains, pus re-collects, and an opening must be made to maintain drainage and to prevent pus accumulating.

Empyrean (Gk. *emp.*, fire). According to the old metaphysical philosophers the E. was the highest and purest of the four celestial spheres, the region of the most rarefied elements of fire. Poetically it is the source of light and the abode of the blessed.

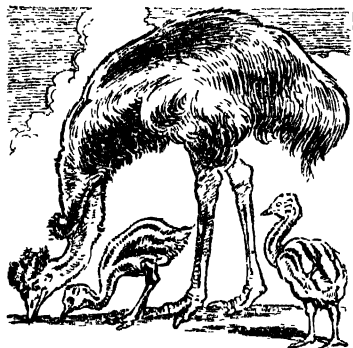
Ems, or Bad Ems, magnificently situated in and watering-place of Germany, in Hessen on the R. Lahn, 10 m. E.S.E. of Coblenz and 15 m. N. of Wiesbaden. Its alkaline mineral springs are among the most efficacious in Europe for the cure of nervous, respiratory, and liver disorders. Famous as the place whence William I. of Prussia despatched the telegram to Bismarck which provoked the Franco-Prussian war of 1870. Pop. 7300.

Ems, riv. of N.W. Germany. It rises in Westphalia, flows through Hanover, and after a course of 200 m. enters the N. Sea, forming an estuary between E. Friesland and the Netherlands and developing an expansion called the Dollart. Three canals connect it with the Lippe, with Jade, and with Dortmund (Dortmund-E. canal).

Emsdetten, com. of Westphalia, Germany, 15 m. N. of Münster. with textile manufs. Pop. 15,000.

Emu, or Emeu, a ratite bird in the family Dromæidæ. Like the cassowary, to which it is allied, it is common to Australia, where it is a protected bird. It stands about 5 or 6 ft. high and is second in size only to the ostrich. It differs from the cassowary in having a broad beak, no helmet, short feathers on the head and neck, and no wattles on the neck, no spines on the wing, and the claws of all three toes are almost equal to one another. The wings are rudimentary, but the powerful legs are well adapted for running, and are capable of giving dangerous kicks when the bird is attacked. There are

only two living species, *Dromæus Novæ-Hollandiæ*, the common E., and *D. irroratus*, the spotted E. Both are monogamous, and the male wholly or partially incubates the eggs. Their diet is strictly vegetarian.



Emulsin, or Synaptase, a neutral substance contained in almonds with the power of acting as a ferment converting the amygdalin of almonds into oil of bitter almonds, hydrocyanic acid, and a sugar. In its pure form it is an odourless and tasteless white powder, which is soluble in water.

Emulsion (a suspension, that is, an even diffusion, which does not separate on standing, of a heavier substance in a lighter medium), a medical preparation in which the drugs neither rise nor fall on standing. Thus, oil, a heavier substance, is suspended by yolk of egg in water, which is lighter. Amongst other drugs, olive oil and petroleum are frequently given as Es.

Enabling Act, see under CHURCH ASSEMBLY.

Enamels and Enamelling. Enamel (formerly 'amel,' through Fr. *amail*, *email*, from a Late Lat. word *smaltum*, same root as 'smelt') is, in the strict sense, the hard, vitreous compound which is fused on the surface of metallic objects for purposes of decoration or utility. The base of enamel is a compound called flux; this is clear and vitreous, and is composed of silica, minium, and potash. Whilst in a state of fusion, oxides of metals are added to colour it, which stain the flux throughout its mass. When a high temp. is required to fuse it, the enamel is termed 'hard'; the harder the enamel the greater its durability, and hence value. When hard enamels are used, pure metals must also be used, as an excess of alloy causes the metal to melt before the enamel is fused, or the enamel to part company with the metal after firing. Enamels are either transparent or opaque. The elements have all undergone an equal degree of liquefaction in the

former case, whilst all transparent enamels are made opaque by the addition of 'calx,' a mixture of tin and lead calcined. In order that the developments which have occurred in the enamelling art may be understood, a brief résumé of the processes required may be given. After the enamel has been procured in lump form, it must be 'pulverised'; for this it is placed in an agate mortar and covered with water; a pestle is then held vertically over the enamel and struck sharply with a hammer to break it, after which it must be ground into a fine grain

articles of personal adornment, and the Romans for the most part copied the Greeks. After the fall of Rome, Byzantium was the centre of the enamelling art. The inhabitants of Great Britain are thought to have excelled in the art at an early epoch, the Celtic work of Ireland being of great beauty. The introduction of the 'basse-taille' process raised enamelling from merely a decorative to a fine art. Of comparatively recent years a revival of interest in both decorative and utilitarian enamelling has taken place, the extensive use of enamelled plates for advertising



British Museum

AN ENAMEL PANEL SHOWING ST. ANTHONY AND THE ARCHER, BY
LEONARD LIMOUSIN, 1536

The arms shown are those of Jean de Langeac, Bishop of Limoges, 1532-41

by rotating the pestle with as much pressure as possible. The powder thus obtained is washed repeatedly in distilled water until all the flinty part is removed. The metal to be enamelled must be cleaned by the application of water and acid: for copper, nitric acid is used; for silver, sulphuric acid, and for gold, hydrochloric acid; all the acid is then removed completely by washing and drying in sawdust. The pulverised enamel is then spread in sufficient thickness to cover the required parts of the metal, which is then dried in front of the furnace. It is then placed carefully, on an iron or fireclay plate, into the muffle of the furnace, which is heated to a bright pale red. When it shines all over it is removed. The process of firing takes only a few minutes, and generally no annealing process is required. The art of enamelling has been practised since very early times. The earliest examples in Assyria are enamelled on bricks and

purposes is one example among many of the latter. All the examples of enamelling, of whatever period, fall into one of the following classes, according to the method of applying the enamel employed: 'champlevé,' 'cloisonné,' 'basse-taille,' 'plique-à-jour,' and 'painted,' and this order is that in which the varieties became known. In champlevé enamels, cells or troughs are cut away in the plate to be enamelled, leaving a metal line raised between them, which forms the outline of the design. The enamel is laid in these cells and filed, smoothed, and polished after fusion. The cloisonné method differs from the above only in that instead of the cells thin metal strips are bent to the outline of the pattern and fixed to the plate by silver solder or the enamel itself. The Pala d'Oro in St. Mark's, Venice, is the finest example of this class of work. The basse-taille process is a combination of metal work, in the

form of engraving, carving, and enamelling. The metal is engraved with the design and carved into a bas-relief below the general surface of the metal, so that the enamel when fused is level with the uncarved parts of the design. Transparent enamel is generally used for this process. Plique-à-jour enamel may be termed translucent cloisonné, as it is similar to cloisonné, save that the ground on which it is fired is removed, rendering it transparent. In painted enamel the colours are laid on to a background of enamel. Miniature-painted enamels do not, properly speaking, come within the category of enamels as the colours applied after the enamel has been fired upon the gold plate used are not vitreous compounds. See E. Molinier, *Dictionnaire des emailleurs*, 1885; J. Labarte, *Recherches sur la peinture en émail*, 1856; C. Popelin, *L'Email des peintres*, 1866; H. Cunyngame, *The Art of Enamelling on Metals*, 1899; J. J. Marquet de Vasselot, *Enaux Limousins, XVe siècle*, 1921; A. Fisher, *Art of Enamelling on Metals*, 1926; M. Chamot, *English Medieval Enamel*, 1930; L. Falize, *Claudius Popelin et la renaissance des enaux peints*.

Enaré, Lake (spelt also Inara, Enari, Indiagher), a lake of Finland, in the extreme N. of the prov. of Uleaborg.

Encaenia, see COMMÉMORATION.

Encaenacion, an important commercial tn. at the terminus of the Paraguay Central Railway, Paraguay, S. America.

Encaustic Painting. This term is employed to describe a picture painted by means of heated wax. It is an ancient method of painting, and the final process consisted of an application of heated wax to the picture. This process is now practically obsolete, but some people consider that neither oil nor fresco paintings are so permanent as the E., which is unfortunately one of the lost arts. Emma J. Greenland, at the close of the eighteenth century, did indeed make some experiments in the endeavour to ascertain the ancient methods, but they met with but poor success, the tint and texture being neither as brilliant nor durable as oil painting. We have no important examples of classic Gk. E. painting, but there are some interesting Egyptian remains of the kind, brought to light at the Oasis of Fayum in 1887.

Encladus, in Gk. mythology, one of the hundred-armed giants who revolted against Zeus and who as he fled and sought refuge in Sicily, was transfixed by a thunderbolt and buried under Etna.

Encephallitis Lethargica (sleepy sickness) occurred first in Vienna in 1917. The general symptoms are fever, lassitude, headache, pain in the back, muscular rigidity and paralysis, sensory and gastrointestinal disturbances. The body temp. usually ranges between 100° and 103°. The lethargy is the most common characteristic symptom, and varies greatly in degree, from a mere drowsiness to a stupor from which a strong stimulant will arouse but for a few moments. Yet in some cases there is restlessness, excitement, and even maniacal symptoms, instead of leth-

argy. The stupor varies in duration from a few days to months, when recovery may still occur. The muscular rigidity is characterised by mask-like facial expression with tremors of muscles in hands and arms. E. L. first occurred in Great Britain in 1918. It is believed to be of microbe origin and communicable from one individual to another. It must not be confused with sleeping sickness, a tropical disease caused by a minute animal parasite (*trypanosome*) in the blood, and transmitted by the tsetse fly.

Encephalocoele, a protrusion of a portion of the brain substance through an opening in the skull. It is most commonly a congenital condition, its importance depending upon its size and situation. It may be described as a visible tumour of the brain, in contradistinction to a cerebral tumour, which is understood as a growth inside the brain.

Encephaloid Cancer is so called from a fancied resemblance to brain material. It is a soft cancer as contrasted with scirrhus or hard cancer and contains a relatively large amount of cells and blood vessels and a less amount of connective tissue.

Encephalon, or **Brain** (q.v.), is that enlarged upper portion of the cerebro-spinal axis contained in the cranium. It comprises the *medulla oblongata*, the *cerebellum* with the *Pons Varolii*, and the *cerebrum*, which last part is subdivided into the *mesencephalon*, the *thalamencephalon*, and the *cerebral hemispheres*. The average weight of the entire mass is some 50 ozs. in the male and 5 to 5½ ozs. less in the female. The E. increases rapidly in weight up to the seventh year, then more slowly, and appears to reach a maximum between the ages of twenty and thirty. Its average specific gravity is about 1.036, the white matter being denser than the grey. Brain and spinal cord together constitute the *central nervous system*. The cavities (*ventricles*) of the brain, and the central canal of the spinal cord, are occupied by the cerebro-spinal fluid.

Enchantment, see INCANTATION and MAGIC.

Enchondroma, tumour containing cartilage, which generally develops in connection with the cartilaginous growing portion of a bone. It can be removed by operation, and does not recur.

Encina (or **Enzina**), Juan del (1468-1530 or 1531), Sp. poet and founder of the secular drama in Spain, was b. at Salamanca. He began writing poetry at a very early age, and *Cancionero*, a collection of odes, lyrics, and dramatic pieces, was printed at Salamanca in 1496. In 1519 he made a pilgrimage to Jerusalem, and wrote a poetical account of this in 1521. His fame, however, does not rest on either of these works, but on his *Representaciones*, fourteen dramatic poems, partly religious, partly secular, the latter of which were acted in Spain in 1492. His most popular work, *La Farsa de Plácida y Victoriano*, was condemned by the Inquisition and lost in 1559. E. held three important positions, viz. secretary to the first duke of Alva; musical director

in Pope Leo X.'s chapel at Rome; and, having taken orders in 1519, he became prior of Leone.

Encke, Johann Franz (1791-1865), Ger. astronomer, studied under Gauss at Göttingen. Through Bessel's influence he became secretary of the Academy of Sciences at Berlin (1825), and director of the observatory there. He superintended the execution of the star-maps of Berlin Academy (1830-59) and the erection of the new observatory (1832-35). He is most famous for his discussion of the orbit of the comet discovered by Pons, 1819. It has since been known as E.'s comet, and has the shortest known period of about three and one-third years. E. also wrote *Die Entfernung der Sonne* (two tracts based on the transits of Venus, 1761 and 1769, 1822-24). He issued four vols. of *Astronomische Beobachtungen auf der Sternwarte zu Berlin* (1840-56). See *lit* by Bruhns, 1869.

Enclave, portion of a state within the boundaries of another, notably in Germany. To the proprietor state the E. is known as its 'exclave.'

Enclosures, see ALLOTMENTS; COMMONS AND ENCLOSURES.

Encratites (Gk. *Ἐγκρατίταις*, self-controlling), a sect of Christian ascetics of the second century (c. 172 A.D.) found at Rome and in Asia Minor. Their leader was the Gnostic Tatian, and they practised total abstinence from flesh, wine, and marriage. They substituted water for wine in the Eucharist, and were hence sometimes called 'Hydroparastatæ,' or Aquarians. They existed as late as the fourth century, and the name came to be given to ascetic Gnostics generally.

Encrinal (Encrinotal) Limestones. This name is given to limestones which abound in the calcareous fragments of crinoids, large masses of the rock being entirely composed of the joints and fragments of their skeletons. Many cylindrical bodies may be found, some flat and coin-shaped, but more often they are elongated and perforated along their long axis by a canal. Hence in some parts these are called 'St. Outhbert's beads.' Such remains are commonest in limestones of the Silurian, Devonian, and Carboniferous ages. Large beds occur in the Hamilton and Helderberg groups in New York state, and in the mountain limestones of N. England.

Encrinites, or Crinoidea (Gk. *κρίνον*, lily and *ἴδιος*, form), the name of a group of radiated animals, forming a class in the phylum Echinodermata (q.v.). They include many species, mostly fossil ('stone lilies'). They have been obtained from Gotland Is., the Wenlock of England, and the Niagara group of N. America (Silurian system).

Encyclical Letters (from Lat. *encyclicus*, circular), an expression indicating in a general sense circular ecclesiastical letters sent on some important occasions by the pope to the bishops. These letters differ from the papal bulls in that the latter generally have some more special object in view. The E. L. is singular (*epistola*), and is issued to the hierarchy, being sealed

with the Fisherman's Ring. E. L. generally contain instructions and warnings against dangers which may threaten the church.

Encyclopædia, a derivative from the Gk. *ἐγκυκλιος παιδεία*, circular or complete education; it originally meant the whole group of studies which every free-born Gk. youth was required to complete in preparation for active life: the liberal curriculum. The phrase was adopted by the Romans, and in both these anc. languages came to mean systematic study of, or instruction in, all the branches of learning. With this idea of encyclo education was soon associated the notion of collecting the materials of such instruction into a single work, where the contents and relations of the various arts and sciences should be systematically expounded. There were many early attempts to produce such a work, though the name E. was not used till the sixteenth century. This is now its common application.

The earliest Es. were treatises or groups of connected treatises adapted for continuous study, not merely for reference, and they contained the more or less extensive accumulation of learning made by their authors individually. The first E. is said to have been compiled by Speusippus (d. 339 B.C.), a disciple of Plato, but of this nothing is known. Among the Romans, Marcus Terentius Varro (d. c. 27 B.C.) was the first encyclopædist, but his *Disciplinarum Libri IX.*, containing treatises on grammar, rhetoric, arithmetic, etc., and another work on Rom. antiquities, have both been lost. The earliest E. we possess is the famous *Historia Naturalis* of Pliny the Elder (23-79 A.D.), a work on natural science, considered especially with reference to human life, and including geography, medicine, and the hist. of art. In the fifth century, Martianus Capella, a native of N. Africa, produced an E. of the seven liberal arts, which was used extensively as a school text-book in the Middle Ages. A similar work was compiled by Isidore, bishop of Seville (c. 570-636), and there were one or two Gk. Es. in the twelfth century. Of these early works the most important is the great *Bibliotheca Mundi*, or *Speculum Maius*, or *Speculum Triplex*, of Vincent of Beauvais, a Dominican friar of the thirteenth century. It was in the reign of Yung Lo (d. 1425) that the vast literary collection known to posterity as the *Great Encyclopædia* was produced though never printed (see CHINA.—Literature). In 1541 the name cyclopædia was first used by Ringelberg of Basol, and Paul Scalich used the term E. in 1559. The seventeenth century saw many Es., including Alsted's seven vols., in Lat.; the *Grand Dictionnaire Historique* of Louis Moreri, with an alphabetical arrangement; J. J. Hoffmann's *Lexicon Universale*; and, most famous of all, the *Dictionnaire Historique et Critique* of Pierre Bayle (1697). The anc. type was changing, and the E. was becoming assimilated to the dictionary. The alphabetical arrangement led to a change of purpose and character in the

compilation, which became a work of reference, giving, instead of the exposition of the system of human knowledge, only the mechanical arrangement of its contents. This aim and method have been adopted by modern Es. in varying degrees. An important characteristic of modern methods is the employment of a large body of specialists both as compilers and editors. Some co-operation existed in the earlier productions, but an elaborate system became essential in the nineteenth century, owing to the rapid advance and multiplication of the special sciences. Coronelli planned a vast *Bibliotheca Universale*, of which only a small portion appeared (Venice, 1701-6). In England the dictionary method was followed by John Harris (c. 1687-1719), who compiled a *Lexicon Technicum*. A supplement 'by a society of gentlemen' appeared in 1744, and was long in popular use. Another more important Eng. work is the *Cyclopædia* of Ephraim Chambers (d. 1740), which contains a systematic use of cross-references. Chambers may be regarded as the father of Eng. encyclopedic lexicography, and he also exerted a wide influence on continental works of this type. It was a Fr. trans. of Chambers's *Cyclopædia*, by John Mills, which formed the basis of the famous *Encyclopédie* of Diderot and D'Alembert (1751-72). In their hands it became the organ of the most advanced and revolutionary opinions of the time, and was the object of much violent persecution. So thoroughly was it identified with the philosophic movement of the time, that the term *encyclopédiste* came to be applied to all who held certain views. It was pub. in twenty-eight vols., including eleven of plates, and five supplementary vols. followed (1776-77) with over 2000 plates, and an analytical table of contents in two vols. (1780). The *Encyclopædia Britannica* (Edinburgh, 1768-71) was planned by William Smellie, a printer, Andrew Bell, an engraver, and Colin Macfarquhar. It was a compromise between the alphabetical and the scientific distribution of subjects. There have been many successive eds., and the fourteenth ed. (1929) has twenty-four vols. The ownership of this E. has passed to the Univ. of Chicago after an interval during which it was the property of Sears, Roebuck, of Chicago. The new ed. (1916) is an enterprise in large-scale revision on a plan not hitherto adopted in any E. It is based upon continuous revision and the issue of regular supplements.

Little change has taken place in the theory of E. making since the beginning of the nineteenth century, but there has been a notable growth of the encyclopedic dictionary and of the special E. The two types meet in the *Grand Dictionnaire Universel du XIX^{ème} Siècle* (1865-1878) of Pierre Larousse, which is a complete dictionary of the Fr. language and includes proper names and a vast amount of information. Among special dictionaries may be mentioned the *Dictionary of National Biography* (1885-1901), ed. by Leslie Stephen and Sidney Lee. Other

noteworthy Es. in Eng. are: *The Edinburgh Encyclopædia*, ed. by Sir David Brewster; *The Penny Cyclopædia* (29 vols.), ed. by Charles Knight; *The English Cyclopædia* (31 vols.), ed. by Knight; *Chamber's Encyclopædia* (10 vols.), ed. by Andrew Findlater; *Johnson's Universal Cyclopædia* (10 vols.); *The Cambridge Encyclopædia*; *The New International Encyclopædia* (20 vols.); *Harmsworth's Encyclopædia* (8 vols.), 1905. Every leading language can furnish a list, and an article on the hist. of Es. is found in vol. cxiii. of the *Quarterly Review*.

Encyclopédistes. This was the name given to a group of Fr. thinkers who were connected with the *Encyclopédie*, a celebrated Fr. work pub. by Diderot and D'Alembert at Paris in 1751-72, embodying the prevailing tendencies of the time as regards philosophy, religion, and politics. It appeared in twenty-eight vols., and was doubtless undertaken because of the success of *Chamber's Encyclopædia* in England. Many of the greatest writers of the day figured among the collaborators—Voltaire, Rousseau, Montesquieu, as well as the chief editors. See J. Morley, *Diderot and the Encyclopédistes*, 1886.

Endecott, John (1589-1665), Brit. Colonial governor, b. at Dorchester. He went to America in 1628, where he became manager of the plantation of Naumkeag (Salem). Two years later he gave place to John Winthrop and headed several expeditions against the Indians. From 1641-44 he held respectively the position of deputy-governor and governor of Massachusetts, and died at Boston, March 15. He, though a brave and benevolent man, was of an austere Puritan disposition.

Endemic, a disease affecting a community, which is caused by local conditions. This distinguishes it from an epidemic, which is a disease brought to a community from a distance. An epidemic, such as small-pox, tends to pass on, whereas an E. disease, like malaria, tends to remain. See also EPIDEMIC.

Enderby Land, large, desolate is. or tract in the Antarctic regions, just S. of the Antarctic Circle, visited by Biscoe in 1831, and named after his employers. It was first discovered by Dirk Gerritz, 1599.

Endive, see CHICORY.

Endlicher, Stephen Ladislas (1804-49), Hungarian systematic botanist, whose chief work, *Genera Plantarum*, has largely influenced succeeding botanists.

Endocarditis, see CARDITIS.

Endocardium. This membrane lines all the cavities of the heart, following the inequalities of the inner surface of the organ and becoming continuous with the inner coats of the attached blood vessels. Beneath a layer of epithelial cells the E. consists of connective tissue with a close network of elastic fibres; occasionally plain muscular fibres are present. The ordinary cardiac muscular fibres in many places are separated from the E. by some amount of areolar tissue, which in certain

subjects may contain considerable quantities of fat. The membrane is usually thicker in the auricles than in the ventricles. Endocarditis or inflammation of the E. may be either simple or ulcerative, and may be associated with a variety of diseases.

Endocarp, see FRUIT.

Endocrine glands, ductless glands forming part of the equipment of the secretive organs of the body, and consisting of thyroid, parathyroid, pituitary, pancreas, suprarenal, and part of the sex glands. They give off substances which affect physical growth and sex development. The various glands are closely interrelated, and recent research goes to show that their action is closely associated with psychological reactions in the human character, and that emotional conditions are therefore based on purely physical phenomena. There are various diseases associated with abnormal conditions of these glands, such as goitre, diabetes, and abnormal blood pressure. Patent medicines offer extracts of endocrine gland secretion, but scientific research is by no means conclusive, and most theories concerning their scientific value are hypothetical. Such medicines include pituitrin, thyroxin, and epinephrin. See L. C. Martin and M. Haynes, *Clinical Endocrinology*, 1948; G. Bankoff, *The Conquest of the Unknown*, 1948.

Endogamy (Gk. *ἐνδον*, within, and *γάμος*, marriage), the custom of marrying only within the limits of a tribe or clan, as opposed to **exogamy** (marriage outside of the clan). This is possibly characteristic of the earliest stages of social organization. In many cases it doubtless arose from racial pride and a contempt for neighbouring peoples. E. prevails in certain parts of Central America, Java, and elsewhere. Since in time E. will impoverish the breed, a restricted form began to be common. Thus the Abors, Kechs, and other Indian peoples forbid marriage between those of the same clan or subdivision of the tribe. See J. McLennan, *Primitive Marriage*, 1865; E. Westermarck, *History of Human Marriage*, 1894; J. Awebury, *Origin of Civilisation*, 1902; Sir J. G. Frazer, *Totemism and Exogamy*, 1910.

Endogens, plants in which secondary wood is developed in bundles which are external to the primary bundles, and by this means growth in thickness of the stem and root takes place. Monocotyledons is the class of plants in which these so-called closed bundles occur, but only such members of the class as arborescent Liliaceae, and Yucca, etc., are E.

Endometritis, see **uterus**.

Endomorph, the term used when one mineral is enclosed within another, the surrounding one being called the perimorph. Such inclusions of minerals are very common in the constituent minerals of crystalline schistose and igneous rocks, and are due to the successive formation of two minerals in a narrow space.

Endoplasm, in the protozoa (q.v.), the granular cytoplasm of the body. It carries on all the metabolic activities of

the animal; it is bounded by a narrow, clear layer of *ectoplasm*, which is firmer than the E. and to a certain extent protective; it is also the layer through which Amoeba (q.v.) communicates with the outside world.

Endor, anct. vil. of Palestino, mentioned in the O.T., S. of Mt. Tabor, 64 m. from Nazareth. The present site is called Endur.

Endorsement, the act of endorsing, that is, writing one's name on the back of a bill of exchange, cheque, note, etc., signifying one's approval, sanction, or ratification of same. When endorsed in this way, a bill may be freely transferred from hand to hand and is negotiable. This is termed **general E.** A **special E.** is where the document of whatever nature is made payable to the order of the transferee, viz., the person to whom it is transferred. Sometimes the document is made transferable by simple delivery to any person without further E., and this is known as a **blank E.**

Endosmosis. When a dilute solution of a substance is placed in a funnel closed at one end by parchment, and the whole immersed in water, the solution in the funnel will rise, due to the fact that water passes in through the membrane faster than the solution passes out. The phenomenon is known as E. See **Osmosis**.

Endosperm, in botany the greyish-white albumen of a seed lying by the side of the embryo, or enveloping it. It consists of a nutritive substance intended for the support of the embryo in its early stage. The bean and kale and similar plants have no albumen round their seeds, and are consequently termed **exendosperms**.

Endothelium, in zoology the membrane that lines blood vessels, lymphatic conductors, and other tubular channels and cavities of the body, usually composed of thin, flat, minute cells.

Endowed Schools Acts, parl. Acts made to prevent misapplication of the foundations for the support of secondary education in England. The Acts do not apply to the chief public schools nor to any schools kept up in any way by voluntary subscriptions without monetary endowment. See under **EDUCATION**.

Endrod, tn. of Hungary, in co. Békés, situated on the Koros, 20 m. N.W. of Csaba. Pop. 14,000.

Endymion, in Gk. legend a beautiful youth beloved by Diana (Selene, the moon goddess). One story makes him a king of Elis, whose grave is shown at Olympia. He was said to have been granted by Zeus the gift of eternal sleep and perpetual youth. The more general story makes him a hunter on Mt. Latmos. E. is sometimes supposed to be a personification of the sun, or of the setting sun's plunge into the sea. The subject frequently forms the theme of pictures (see those of Watts in modern times), and is found on anct. wall-paintings and Rom. sarcophagi. See Keats, *Endymion*; Robert, *Antike Sarkophag-Reliefs*, A., 1898.

Enema, liquid preparation intended for injection into the rectum, by means of a syringe or other suitable apparatus. It

was formerly known as clyster. Es. most commonly in use are water, soup and water, or oil.

Enemy, see **BELLIGERENT**; **INTERNATIONAL LAW**; **WAR**, etc.

Energatype, see **FERROTYP**.

Energumen, name given to one supposed to be possessed by evil spirits. In primitive races mental and nervous afflictions are frequently thus explained, and a cure thought to be effected by means of prayers or incantations. Such persons were sometimes known as 'energici' ('tossed by the waves'; of uncontrollable impulse). They could only occupy the porch with the lepers and the defiled at church services. The order of exorcists in the Church was instituted to free Es. from their obsessions.

Energy, the power of doing work; in physics and theoretical mechanics, that attribute of a body or material system by virtue of which the body or system is enabled to perform work. Simultaneously, work is defined as the overcoming of resistance through distance. The E. of a system, if due to motion, is called E. of motion, or 'kinetic' E.; whilst the E. it possesses on account of its position or its state of strain is called 'potential' E. by way of distinction. A steam-hammer when at rest in its highest position is a good type of 'potential' E. Again, in the vibrations of a pendulum, the E. is constantly being changed from a kinetic to a potential form. All forms of E. can be classified under one or other of the types, kinetic or potential E. For instance, kinetic E. is visible in mass motion, visible or invisible wave motion (sound, light, etc.) of electric currents, and so on; and potential E. is recognised in raised masses, magnetised bodies, separated electric charges, etc. One characteristic of all E. is its property of transformation, and in all its transformations there is evident the property of *conservation* of E. The physical law that is known by this name asserts that the total amount of E. in any isolated system is absolutely invariable in amount. E. may be added or abstracted from without, but as long as no external influences intervene the total quantity of E. within the system can neither increase nor decrease. It is usual, therefore, to say that the entire E. of the universe is conserved. Galileo seems to have been familiar with the idea that E. cannot be created, a fact which he inferred from a careful study of the machines, all of a simple nature, that were used in his day. However, there appeared to be many cases in which E. is destroyed, and all mechanical E. is gradually wasted away by frictional and such-like losses, the mechanical E. being converted into heat E. The motions of the celestial bodies are far more easily described by the aid of the principle of conservation of E. than they could be without it. See W. McDougall, *The Energies of Men*, 1932; E. Osty, *Super-normal aspects of Energy and Matter*, 1934; A. Wood, *Joule and the Study of Energy*, 1934; M. Moth-Smith, *The Story of Energy*, 1934.

Enfantin, Barthélemy Prosper (1796-1864), son of a banker in Paris, became one of the chief founders of the Saint-Simon school of Socialism. From 1826 till 1830 he was associated with Bazard in carrying on H. de Saint-Simon's work, but they eventually disagreed on the question of marriage, E. being an advocate of free-love, which led to his prosecution in 1832. He was imprisoned for a year, and on his release became editor of the journal *Le Crédit Public*. His collected works were pub. in (*Euvres de Saint-Simon et d'Enfantin* (1865-78). See H. Castille, *Le Père Enfantin*, 1859.

Enfield, tn. and par. of Middlesex, England, 10½ m. N. of London Bridge, situated in the valley of the Lea. It has of late years become a residential suburb of London. The New R. flows through it, and Middleton House, the home of Sir Hugh Middleton, the first director of the New River Company, is here. The perpendicular church contains fifteenth to sixteenth century tombs. There are remains of Enfield Palace at which Princess Elizabeth was staying at the time of her father's death, now the Constitutional Club. There is an anct. Brit. entrenchment in what was the park. Charles Lamb resided at Chase Side, and Isaac Disraeli, father of Lord Beaconsfield, was born here in 1766. The Royal Small Arms Factory is at Enfield Lock. Pop. 67,000.

Enfield, tn. of Connecticut, U.S.A., situated in Hartford co. on Connecticut R. Tobacco is grown and carpets and basket hardware made. Pop. 16,000.

Enfield, William (1741-97), Eng. Non-conformist clergyman, b. at Sudbury, Suffolk, and author of the well-known *The Speaker* (1774), *Preacher's Directory*, and *Abridgement of Brucker's History of Philosophy*. Also compiled *Institutes of Natural Philosophy*, theoretical and experimental.

Enfilade (fr. from *enfiler*, to thread, to pass through from end to end), a military term used when the firing is directed along an enemy's line or parapet. It is a most effective form of fire, being extremely difficult to meet, and entrenchments or parapets are useless as cover. The usual form of defence against an E. is a *traverse*, or bank of earth raised at right angles to the lines of defence.

Enfranchisement, see **COPYHOLD**.

Engadine, Swiss part of the valley of the Inn in the canton of the Grisons. It is traversed by a carriage road from the Maloja Plateau (5935 ft.) at the S.W. end to Martinsbruck (3406 ft.) at the N.E. end, a distance of 56 m. It is divided into the Upper and Lower E., the cap. of the former being Samaden (pop. 967), of the latter, Scuol (pop. 117). The Upper E. is the best known, and is a favourite health resort, the mineral waters of St. Moritz having been known since the sixteenth century. Pontresina is a centre for tourists. The valley is reached by road over the passes, and there is a railway running under the Albula Pass to St. Moritz. The language spoken is Ladin (an old Romance tongue) or Ger. Pop. 14,000.

Engelberg, beautifully situated vil. of Switzerland, the terminus of the electric railway from Stansstad on the Lake of Lucerne, a favourite summer resort, and one of the most popular winter sports centres in Switzerland. The Benedictine Abbey was founded in 1120 and the whole valley ruled by the abbot until 1798. No ladies are allowed to inspect the valuable library, but men may. Pop. 2400.

Engels, Friedrich (1820-95), Ger. Socialist, b. at Barmen, the son of a wealthy cotton-spinner. After spending two years in England writing for the organs of the Owenite and Chartist movements, he went to Paris and there visited Karl Marx (*q.v.*). The two became close friends and worked so much together during the remainder of their lives that the works of the one became more or less the works of the other. E. wrote in collaboration with Marx, *Die heilige Familie oder Kritik der Kritischen Kritik* (1845), and *Manifest der Kommunistischen Partei*, the famous communist manifesto (London, 1848; Eng. ed. 1848 and 1888). After the death of his friend he pub. the third and last vol. of Marx's work, *Das Kapital* (1885). See F. Mehring, *Aus dem literarischen Nachlass von Karl Marx, Friedrich Engels, und Ferdinand Lassalle*, 1902; J. Mayer, *Friedrich Engels*, 1920; D. Ryazanoff, *Friedrich Engels and Karl Marx*, 1927; E. H. Carr, *Karl Marx*, 1934.

Engels, tn. in the Saratov Region of the R.S.F.S.R. on the l. b. of the Volga, opposite Saratov. There are timber, meat-processing and packing works. Pop. 73,200.

Enghien (Flemish *Edingen*), tn. in prov. Hainaut, Belgium. It is famous for its lace, and was once the seat of the Condé family, the dukes of E. The castle was burnt down, but the park still remains, and contains a stone cottage built by an ancestor of the present owner, the duke of Arenberg, for Jean Jacques Rousseau. Pop. 4600.

Enghien, Henry I. and II. de Bourbon, Ducs d', see CONDÉ, PRINCE DE.

Enghien, Louis Antoine, Henri de Bourbon Condé, Duc d' (1772-1804), son of Henri Louis Joseph, prince of Condé, and Louise Thérèse Mathilde, sister of the duke of Orléans (Philippe Egalité), born at Chantilly. In 1792 he was given a command in the Fr. royal army of *émigrés*, and served in the Condé army under his father and grandfather. After the peace of Lunéville (Feb. 1801), he retired to Ettenheim in Baden, having married the niece of Cardinal de Rohan, the Princess Charlotte. In 1804 he was falsely accused of being implicated in the Cadoudal-Pichegru conspiracy, and by Napoleon's orders he was seized and taken to the castle of Vincennes, where after the pretence of a trial he was shot. He was the last of the house of Condé. See A. Maricourt, *La Mort du Duc d'Enghien*, 1930.

Enghien-les-Bains, tn. of the dept. Seine-et-Oise, France. It is not far from the forest of Montmorency and only 8 m. from Paris, and is a favourite health resort with sulphurous water. Pop. 11,300.

Engineering, in the stricter sense, the art of constructing and using engines; but, in the wider sense, means the whole range of design and construction of what may be broadly termed 'works,' the designing and construction of steam, oil, and other engines and motive power generally, the construction and operating of electrical installations and the construction of plant for chemical processes. In a popular classification, we may include such branches as agric. E., automobile E., and wireless E., but the more scientific and orthodox classification is into the five divs.: civil, electrical, mechanical, mining, and chemical. The term 'civil engineer' is used in contradistinction to that of military engineer; the nature of the work being concerned with all branches of civil construction. The design, construction, and maintenance of public works, such as docks, irrigation schemes, bridges, viaducts, drainage, etc., and also what is rather vaguely called 'constructional engineering.' The definition of the profession by the directing body in Great Britain, the Institution of Civil Engineers (Great George St., London) is simply, 'the art of directing the great sources of power in Nature for the use and convenience of man.' Electrical E. comprises the two classes, manufacturing and operating, and is concerned with the construction, installation, and maintenance of electrical machinery and engines, such as power-stations, lighting, heating, electric railways, and machinery for the transmission of electrical energy, such as dynamos, accumulators, cables, as well as telegraphy and wireless apparatus. Strictly electrical E. is secondary to mechanical E., inasmuch as electricity is not a prime mover; the initial power, which the electrical engineer helps to transmit, comes from steam or i.c. engines, or from water-power, etc. But practical considerations, especially of training, demand the retention of these orthodox divs., and all of which have their appropriate governing body; thus the directing body of the electrical engineer is the Institution of Electrical Engineers (Victoria Embankment, London).

Mechanical E. is the most extensive branch of the profession and embraces the work of designing, constructing and operating engines, whatever their motive-power—steam engines, gas engines, internal-combustion engines, etc. The mechanical engineer must have a knowledge of the mechanics of engines, boilers, turbine action, etc. The rapid development of the internal-combustion engine has presented ever new problems in the construction of petrol-driven engines, of varying pressure and temp., maximum energy and minimum weight, combined with economy of fuel consumption and, naturally, offers a wide field for a career. The directing body, the Institution of Mechanical Engineers, has its premises at Storey's Gate, London. Mining E. is concerned with the building, erection and working of apparatus for sinking mines, and geological surveying for metalliferous areas or oil-field development. The

directing bodies are the Institution of Mining Engineers and the Institution of Mining Metallurgy, both at 225 City Road, London, and the Institution of Petroleum Technologists, Bedford Street, London. Membership depends on the branch or branches of mining E. adopted. There is scope for the mining engineer both in Great Britain and overseas, in commercial companies—which in Britain generally implies coal, and sometimes iron ore, lead and tin—as mine inspectors and surveyor under the Mines Dept., practical experience being essential. For chemical E., see CHEMICAL ENGINEERING. Agric. E. is concerned with mechanically-propelled tractors, engines for driving pumps, dynamos or lighting, chaff- and root-cutting machinery, and dairying machinery. See also ENGINEERING EDUCATION AND TRAINING; ENGINEERING, MILITARY, etc.

Engineering and Architectural Societies. While the leading architectural societies are found mainly in London, several of the important engineering societies are located in other large towns, dealing with some specific engineering industry. Some of the societies are: Royal Institute of Brit. Architects (f. 1834), 66 Portland Place, W. 1; Incorp. Assoc. of Architects and Surveyors, 75 Eaton Place, S.W. 1; The Architecture Club (1922), 229 Strand, W.C. 2; Architectural Assoc. (1847), 34-36 Bedford Square, W.C. 1; R. I. of Architects of Ireland (1839), 8 Merrion Sq., Dublin. The Institution of Civil Engineers (1818), Great George St., Westminster, S.W. 1; Inst. of Mechanical Eng. (1847), Storey's Gate, St. James's Park, London; Soc. of Engineers (Incorp. 1910), 17 Victoria St., London; Brit. Engineers' Assoc. (Incorp. 1912), 32 Victoria St., London; Inst. of Marine Engineers, 85-88 The Minories, London; Inst. of Electrical E. (1871), Savoy Place, London; Inst. of Mining Engineers (1889), Salisbury House, Finsbury Circus, E.C. 2; Junior Inst. of E. (1884), 39 Victoria St., London; Inst. of Municipal and County Engineers (1873), 81 Eccleston Sq., London; Inst. of Structural Engineers (1908), 11 Upper Belgrave St., London; Inst. of Gas Engineers (1863), 1 Grosvenor Place, S.W. 1; Inst. of Water E. (1896), Parliament Mansions, Westminster, London; Inst. of Heating and Ventilating E., 72 Victoria St., S.W. 1; Inst. of Automobile Engineers, 12 Hobart Place, S.W. 1; The Illuminating Engineering Soc., 32 Victoria St., London; Inst. of Engineers and Shipbuilders in Scotland (1857), 39 Elmbank Crescent, Glasgow; Inst. of Civil Engineers of Ireland (1835), 35 Dawson St., Dublin; N.E. Coast Inst. of Engineers and Shipbuilders, Bolbec Hall, Newcastle-upon-Tyne.

Engineering, Civil, see BRIDGES; DOCKS; CANALS; ENGINEERING; DRAINAGE; HARBOURS; RIVER ENGINEERING; ROADS, etc.

Engineering Drawing is the chief medium by which the engineer conveys his ideas to others, and the drawing office is the connecting link between the engineering department and the machine

shops. The draughtsman's function is to develop the sketches drawn by the engineers into the finished drawing from which the machinist takes all his measurements. It is in the drawing office that the inventions come to life and indeed where many may reveal fatal flaws. From the pencil-drawing an ink tracing is made on tracing paper or cloth; this work is done by junior draughtsmen, and in many works it is done by girls. Photo-prints are taken from these tracings, the commonest of which are the ferro-prussiate ('blue' prints) or 'photostats' of these prints sent to the drawing stores in the machine shops and one copy is put in the records. A drawing office is an excellent place for the young engineer to receive his training, for he sees designs of all the pieces of machinery from their earliest stages to completion. See J. Duncan, *An Introduction to Engineering Drawing*, 1922; W. Abbott, *Machine Drawing and Design*, 1936; A. Craver, *Engineering Drawing*, 1939.

Engineering Education and Training. When a boy leaves school there are two courses open to him for gaining his training; they are (i) A three years' course at a univ., at the end of which he sits for his degree; or (ii) practical training at manufacturing works coupled with evening classes. The deciding factor in the choice is, of course, the amount of cap, which can be spent upon the training. The first of these two is by far the better because it enables the student to acquire a thorough acquaintance with theory. The first year at the univ. is spent mainly in the study of mathematics, physics and chemistry, together with Fr. and Ger., in preparation for the intermediate examination, which is taken at the end of the first year. The second year takes the student further into mathematics, covering differential and integral calculus while continuing physics and modern languages. He now specialises in the branch of engineering which he proposes to take up, whether mechanical, civil, electrical, or one or other of the sub-divs. of these main classes. In the third year mathematics include the problems which the engineer is likely to meet with in the course of his work. At the end of the third year he sits for his degree.

Engineering works take youths at the age of fourteen for training as skilled mechanics and as foremen. Those who show exceptional ability are often encouraged to attend evening classes so as to acquire a better knowledge of their profession with the view of obtaining positions on the technical staff of the works. In large works these boys are under the care of instructors, who put them to and aid them to complete set tasks. See W. Kearton (ed.), *The Engineering Educator*, 1928; C. V. Mann, *Engineering Education*, 1930; *The Teaching of Mechanics* (Mathematical Association), 1930; V. Wilmoth, *Civil Engineering as a Career*, 1946.

Engineering, Military. M. E. is the adaptation of engineering practice to military requirements. As was evident

in the First World War, a civilian engineer can readily take his place on the executive side of M. E., but on the administrative side military experience and training are required. A modern army must rely on civilian resources to a very great extent, not only for manpower and material, but also for technical experts, and among the latter the military engineer is of the highest importance. The First World War gave a great impetus to scientific development, notably in chemistry, metallurgy, and electricity, which three branches of scientific study have had a revolutionary effect on the military machine, e.g. in the making of poison gas, high explosives and synthetic oil; in the application of the internal combustion engine to aviation and tanks; and in wireless telegraphy, respectively. M. E. is directly concerned with all these developments, and in the decade before the outbreak of the Second World War the greatest problem for military engineers was 'mechanisation', i.e. the utilisation of mechanically produced power in order to increase mobility and to conserve physical energy. The task of M. E. is to assimilate the tremendous increase of engineering knowledge into the technique of war. The co-operation of the General Staff of a modern army with the military engineer is necessary to effect this process. But as the members of the General Staff of a modern army are not experts in M. E., though they are responsible for policy, the modern military engineer must be able to act in a consultative capacity as well as to carry out the current and ordinary engineering work of an army. In other words, his task is to interpret the policy of the General Staff in terms of the developments of science. Besides the military engineer, there is the engineering specialist, whose duties are restricted to the work of research and design in military maintenance. On the extent to which the distinction between the military engineer and the specialist in design and research is preserved in departmental organisation, efficiency in M. E. will largely depend. Every new device, and every application of a new weapon has its reaction on numerous other devices and weapons, e.g. if a more efficient anti-tank gun is produced, a faster or more highly armoured tank must replace previously existing tanks, and this, in turn, may call for progress in bridge design to carry a heavier tank. Thus, to attain all-round efficiency in an army, the fighting machines must be evolved as a co-ordinated whole; and it is in this sphere that the consultative advice of the military engineer assumes such importance. In the Brit. Army the training of military engineers is effected by the education and theoretical training of personnel of the Corps of Royal Engineers; which training comprises a course of theoretical training at Cambridge Univ., a course of applied practical training in military materiel at the School of Military Engineering; a period of practical apprenticeship with civilian mechanical and electrical manufacturers and consultants; and experience in combatant

duties by co-operation with other arms of the army through the R.E. field companies.

In the Second World War Brit. M. E. made a great contribution to victory on all the prin. fronts, e.g. in Italy, in 1943, if for no other reason that in no prior campaign an enemy carried out demolition on so vast a scale and in terrain so perfectly adapted to it. In the area about the line Foggia-Naples a region of mt., gorge and riv., the Gers. had blown almost every bridge and culvert, both on roads and railways, and there were entire sections of the railway along which their wrecker-train passed, uprooting and smashing every sleeper and cutting every rail. In these circumstances were used one of the great inventions of M. E., the *Bailey Bridge*, standardised and adaptable to almost any load, it was the product of the Royal Engineers' Experimental Bridging School, after one of whose profs. it was named. This bridge can take loads as heavy as the largest tank on a transporter and solved the problem of bridging behind the line. The Royal Engineers were also responsible for the duty of sweeping the approaches to assault-crossings with the aid of *mine detectors*. *Bulldozers* led the tanks into battle, carving a path for them under heavy fire. In Italy the Volturno and Garigliano opposed two major water-obstacles and the crossings of these rivers was carried out in successive phases--the infantry made the initial battle-crossing by assault boat, while their equipment followed by raft. The Engineers, meanwhile, worked to substitute bridges at the earliest possible moment and so to pass a continuous stream of traffic. The first bridges were light, floating affairs carried on *folding boats*. These were quickly supplemented by Bailey Bridges. These bridges also played a great part in the crossing of the Rhine on the Brit. section of that front in 1945. Another great M. E. achievement was the construction of a system of petrol pipe lines between the base ports and the front. The laying of these pipelines was the work of engineer personnel from the United States who quickly laid the pipe and installed the chain of boosting stations and constructed the storage tanks, thus latter operation involving very nice adjustment. Aerodrome work was another major task of M. E. Thus, in Italy, the Brit. Aerodrome Construction Company and the Amer. Aviation Engineers between them built some 30 airfields, mostly round Foggia. See further under ENGINEERS, CORPS OF ROYAL.

Engineers, Corps of Royal. Before the eighteenth century the technical elements of the Brit. Army, e.g. artillery and engineers, were provided by the Board of Ordnance, and both artillery and engineers officers formed part of the early 'Artillery Trains.' The system under which artillery units were raised for a campaign was found to be inadequate and uneconomical, and as a result artillery companies (now Royal Artillery) were estab. in 1716, and the ancestor of the R. E. in 1717, both

emerging from the Board of Ordnance. Before 1757 the officers of the R.E. did not have military titles, but in that year they were first granted commissions. It was not until 1788, however, that the military officers of the Engineer Dept. were constituted the 'Corps of Royal Engineers,' the men being still regimented in the Corps of Royal Military Artificers. When Napoleon invaded Egypt a detachment was sent to Constantinople to train the Turkish army, and other companies performed good service in Egypt, Malta, Italy, Sicily, and the West Indies. In 1813 the title of the Corps of Royal Sappers and Miners displaced that of Mil. Artificers and did effective work under Wellington during the Peninsular and Waterloo campaigns. The Crimean War was the scene of manifold activities by the engineers, and the officers and men were, immediately afterwards, united to form one corps under the title of 'Royal Engineers.' After the Indian Mutiny the Bengal, Madras, and Bombay Corps of Engineers were transferred to the R.E.

Being a scientific corps the R.E. has 'nursed' many important branches of military science, particularly the Royal Flying Corps (now the Royal Air Force), which was evolved from the Air Battalion of the R.E., and the Royal Corps of Signals which was evolved from the Signal Units of the R.E. The work of the Engineers in any theatre of war extends from fieldworks in forward areas to the construction, operation, and maintenance of ports on which the theatre is based, and right through the intervening organisations. They construct or adapt buildings necessary for barracks, hospitals, and stores. They make tracks and roads; provide water and light, and dispose of sewage; build roads, bridges, and fords and lay, repair, and run the railways. They run laundries, and mobile bath units. They make and clear airfields and landing grounds. They do the army's survey work and produce maps. They are concerned in all major camouflage; they are expert in chemical warfare and smoke; they operate their own heavy engineering workshops and electrical installations. They do ship and barge construction and repair; they undertake munelifting and bomb disposal, and conduct the army's postal service. They are responsible for movement control. Such operations are conducted in field units, and in L. of C. units which are not fully mobile.

The widespread services of this corps are aptly expressed in their mottoes, granted in 1832, 'Ubique' and 'Quo fas et gloria ducunt.' The King is Colonel-in-Chief of the Corps.

Engines. *see* AERO ENGINE, AIR ENGINE, BOILERS, GAS ENGINES, INTERNAL COMBUSTION ENGINE, STEAM ENGINES.

England and Wales. Topographically England and Wales may be viewed together or as separate units; administratively, for purpose of local and imperial gov., in matters of statistics, etc., they are one. Special geographical features peculiar to Wales will be found in that

article, and there are separate articles on the various cos. both of England and Wales. Of the group of is. which lie off the W. coast of Europe, and which form the United Kingdom of Great Britain and Ireland, England (including Wales), the most important portion in wealth, pop., size, and as possessing the centre of the imperial gov. and administration, lies between lat. 55° 46' N. at the mouth of the Tweed, and lat. 49° 57' 30' N. at the Lizard, and between long. 1° 46' E. at Lowestoft, and 5° 43' W. at Land's End. It is separated from Scotland N. by a line running from Berwick-on-Tweed to the head of Solway Firth; bounded on the E. by the N. Sea, S. by the Eng. Channel; the Strait of Dover, 21 m. at its narrowest point, divides it from the coast of France, which is 100 m. distant at the Lizard. At the S.W. corner the broad and deeply indented Bristol Channel parts the S.W. coast of England from Wales and opens on the Atlantic; on the W., St. George's Channel divides Wales from Ireland and leads to the Irish Sea and thence to the N. of St. Patrick's Channel between Ireland and Scotland. The coast-line, following broad indentations and including the is. of the Isle of Wight and Anglesey, is about 2350 m. The total area is 58,315 sq. m., of which England contains 50,939 and Wales 7376 sq. m.

England is divided into forty territorial cos., and Wales into twelve (see further *Population and Local Government*, below).

The Cheviot Hills, highest point the Cheviot (2676 ft.), form a considerable portion of the N. boundary; S.W. lie the Cumbrian mts. with Scafell Pike (3210 ft.), the highest of England's mts.; here, in Cumberland and Westmorland, is the Lake Dist.; E. and running as the central feature of N. England is the Pennine Range, which reaches almost to the Midlands, and E. and W. of which are to be found the prin. centres of industry, for in close proximity are the great coal fields, which on the E. side supply the iron and steel industries, originally getting all their raw material from the iron ores of this region; it is this close proximity of coal that on the discovery of steam power and of the use of coal for iron-smelting estab. this part of England as the centre of the world's industries in the early part of the nineteenth century. The high moorlands of the Pennine Range form an anticline, with a few beautiful health resorts, and much picturesque scenery especially round the Peak in Derbyshire. On the E. side are concentrated the wool industries, centred in Bradford, Leeds, and Huddersfield, estab. before the age of steam and then spreading to the W., now no longer drawing its supplies from the former sheep-farms of Yorkshire and the Continent but from the world. The great iron and steel works are at Middlesbrough, Stockton, centred on the Tees, shipbuilding on the Tyne, the cutlery and armour plates at Sheffield, from early times celebrated for its knives. To the N., the Northumberland coalfields reach the coast at Newcastle, with South Shields and Sunderland on the coast. To the W.

the inflow of cotton through Liverpool has changed Lancashire into a vast hive of cotton-spinning and cotton-weaving tns., centring on Manchester, and further S.W. the coalfields supply necessary power to the potteries of Stoke and the surrounding dists.

Away from the Pennines, but still in reach of the coal, lies Birmingham, the nucleus of the great metal-working industries of the Midlands, and Coventry, that of motor-cars and bicycles, while on the fringe lie such manufacturing centres as

the ravages of continual wars and the confusion of political revolutions.

Where the Pennine Range ends begins the great Midland plain, reaching from the fenland dists. of Lincoln, Huntingdon, and Cambridgeshire, now drained, and the rich agric. levels of Norfolk to the typical inland country stretching from Leicester and Nottingham to the valley of the Thames to the S. and to Warwickshire, Worcestershire, and Gloucestershire to the W., where the Bristol Channel fed by the Severn and the Avon, and the great



THE MOORLANDS OF THE NORTH: HADRIAN'S WALL

JOHN H. Stone

Leicester, Nottingham, working chiefly in leather and lace. The proximity of the sea, never, throughout England, more than 75 m. distant, and the navigable rvs. have played an important part in its development. The Tyne, the Tees, the Humber, with its great shipping port of Hull on the E., the Mersey, on the W., with Liverpool and its great artery the Manchester Ship Canal leading to the very centre of the cotton industry and linked by a network of canals, still bearing coal and heavy traffic to the potteries, Birmingham, and the Midlands, all these factors, combined with the rapid development of the railways prior to those of any other country, form an easy explanation of the unchallenged supremacy of England, commercially and industrially, when America was in its infancy and the Continent of Europe was still recovering from

industrial city and port of Bristol bring the natural water-way for traffic to its doors. This plain dist. is the centre of the agric. industry of England, both tillage and pasture, and the scenery is typical of pastoral England, the chief tns. being originally and in many cases still mkt.-tns., though the railway has made Crewe, for example, a great engineering centre, while Reading and Luton are manufacturing tns. in agric. dists.

London (q.v.) and the Thames stand by themselves, and dominate the home cos., as they are termed, which lie on both banks of the riv. One of the greatest of the world's ports, a manufacturing tn. of the most diverse industries, the centre of the money mkt. of the world, the business heart of the country, the seat of gov. of the empire, London spreads the dwelling-places of its workers wider and wider.

Along the Thames valley lies a line of residential tns. and dists., and the railways bring a daily tide of those who sleep in the country and work in the tn.

From the white chalk cliffs of Dover through Kent and Surrey in a curving line lie the N. Downs overlooking the gardens of Kent and the low Weald, now agric. and attracting residential building; to the W., below and within the Downs, are the healthy pine-woods and sandy heath of Surrey, falling into Hampshire and rising to the great plateau of Salisbury Plain. Running along the S. coast, from the flat marshes of the old world port of Rye, are the whalebacked bare S. Downs looking on a ring of sunny seaside resorts, with Brighton in the centre. Southampton, with its great docks and shipping trade, and Portsmouth, with its naval docks and arsenals, are made by the inlet of Southampton Water, guarded from the Channel by the Isle of Wight. Cornwall forms a rocky peninsula, connected geologically with the mt. system of Devon; here on the S. coast lie the sunniest and warmest part of the Brit. Isles. W., where Land's End meets the Atlantic, the scenery is bold and rugged and beautiful, and up the Cornish and Devon coast of the Bristol Channel is perhaps the most lovely dist. in England, where the wild uplands of Exmoor and Dartmoor stretch down in wooded combs to the sea.

On the Welsh side of the Bristol Channel lie the great steam coal-fields of S. Wales centring in the ports of Cardiff and Barry Dock, with Newport, Swansea, and Merthyr-Tydvil, seats of iron and copper smelting and tin-plate manufacturing. Wales, mountainous and rugged, finds her industrial life here; the centre is agric. and thinly populated; the N., though with great slate quarries, chiefly attracts countless visitors to her scenery of mt. (Snowdon, 3560 ft., is the highest point in England and Wales), lake, and sea (see *further under WALES*). On her land side Wales meets the great midland plain in the pastoral and agric. co. of Shropshire, with isolated hill country. The N.W. coast of England stretches from the Mersey estuary, leading to Liverpool and the industrial centres, along the sand-levels where lies Blackpool, the Brighton of the N., to Morecambe Bay, the great shipping and ironworks of Barrow-in-Furness and the coastal coalfields of Workington and Cocker-mouth.

SCENERY.—The Eng. countryside varies from well-wooded hills to cultivated plains. Mt. country is centred in the Lake Dist., Cumberland and Westmorland, and in Wales, while much of Yorkshire, Devon, and Cornwall is moorland with moss-covered rocks, bogs and streams. The bare downs of Sussex were once covered with forest, but are now treeless grasslands. The downs continue into Kent, which is called the Garden of England. Here are the fruit fields, the orchards and the hop-gardens, with near them the cone-shaped oast houses. The E. plain is flat country, much of which is fenland, drained by the Ouse, smaller rivers, and the Norfolk Broads. Much of the

Midlands is spoilt by the smoke and sulphur of the industrial area, but attempts are made to preserve walks from the builders. In the S. also, where Greater London spreads over a vast stretch of land, many parks and commons have been preserved.

One characteristic of Eng. scenery is the div. of the land into fields, and the most common barriers between them are hedges of clipped hazel and hawthorn trees. Gaps in the hedges are bridged by wooden stiles, while in some cos. the fields are divided by low stone walls. By the side of the hedge grow many wild flowers—primroses, violets, ground ivy, and wild roses. Other common wild flowers are the buttercup, daisy, scabious, pansy, poppy, snowdrop, daffodil, celandine, and dandelion, while in the woods are found bluebells and wood anemones. The most common trees are the oak, hawthorn, elm, ash, horse-chestnut, willow, birch, poplar, and beech. Different kinds of fir trees also flourish, but the only nut trees are the eating chestnut, walnut and hazel. Blackberries, strawberries, and mushrooms grow wild in fields and hedges, while the grass is everywhere green throughout the year, greenness being a feature of the Eng. countryside.

The Eng. coast is very varied, differing from sandy or shingle shores to granite or chalk cliffs. The many rivers are well stocked with fish, including salmon, roach, dace, and barbel. The Wye in the W. is one of the most beautiful rivers. New bridges are mostly plain and of concrete, but there are a number of interesting old ones, such as the fifteenth-century bridge over the Ouse at St. Ives, Huntingdonshire.

In the tns. old houses may still be found. Chester has some very beautiful timbered houses, and in London there are whole streets of that admirably urban eighteenth century architecture. The univ. tns. of Oxford and Cambridge have buildings of every century from the fourteenth. Durham Univ. is housed in the old castle. Several famous castles still stand, among them are the Tower of London with its keep, begun in 1078, Windsor Castle and Arundel Castle. Of historic ruins there are Bodiam Castle in Sussex, with a moat still full of water, and Tintagel in Cornwall, near where King Arthur is supposed to have held his court, and many others. Penshurst Castle, in Kent, is the manor house in which Sir Philip Sidney lived; its great hall, with grey time-worn oak-raftered roof and minstrel's gallery, is exceptionally well preserved. Humbler dwellings in the vills. are the cottages of lath and plaster with skillfully-thatched roofs. Melbourn, near Cambridge, is a typical old-world vil. Some timbered cottages still exist, one of which is Milton's Cottage at Chalfont St. Giles. Another famous cottage—of whitewashed brick—is John Wesley's in Swanage.

Parts of the forests—the New Forest, Sherwood and Ashdown Forest—still remain, and some, such as Epping, are state-preserved. At Waltham Cross, near Epping, is an Eleanor Cross, and many

other old stone crosses are scattered over England. Since the First World War nearly every vil. green has its war memorial, while the Cenotaph (q.v.), the Brit. war memorial to all those who fell in the two World Wars, is in Whitehall, London. There are many famous caves such as the Cheddar caves in Somerset, while probably the oldest monuments are the circles of stones at Avebury and Stonehenge, the latter dating from c. 1680 B.C.

There are few wild animals left in E., and some of them are hunted. The fox and otter and semi-wild ponies and deer are the largest that remain. There are many birds, both resident and visitant, but there again the larger ones, such as the buzzard and the peregrine falcon, have all but been killed off, although many cos. preserve certain birds by law.

GEOLOGY.—See GEOLOGY.

Climate.—The mean annual temp. ranges from 48° F. in the N. to over 52° F. in the Scilly Isles, off Land's End, but this variation moves diagonally, and the W. coast is warmer throughout its length than the E. The mean coldest temp. is about 40° F., the hottest, 61°. The prevailing winds are south-westerly and westerly, but from April the tendency is towards easterly winds. The rainfall is heaviest in the W., especially in the Lake Dist., Wales, Cornwall, and Devon, where it exceeds 40 in., and in the first two places as much as 60 in. On the E. coast, especially at the Wash and the Thames estuary, it falls to 25 in. Sunshine reaches about 1600 hrs. in the year on the S. coast and falls to less than 1300 in Yorkshire.

POPULATION.—By the census of April, 1931, the total pop. of England and Wales was 39,952,377, of which 19,133,010 were males, and 20,819,367 were females. This total comprised visitors and residents, Brit. nationals and aliens, civilians and non-civilians, and was the largest yet recorded, showing an increase of 2,065,678 over the returns by the previous census of June, 1921. The decennial increase per cent in 1881 was 14·4; 1891, 11·6; 1901, 12·2; 1911, 10·9; 1921, 4·97; and 1931, 5·4. The figures of National Registration of Sept. 1939, which did not include members of the Armed Forces, are given below in parentheses after the 1931 figures for cos. and tns. It should be noted that these totals include persons evacuated from the tns. in which they were normally resident. (The pop. in 1941 was estimated to be 41,460,000). In June 1931 the pop. of England was 37,358,000 (46,073,000 in 1939), and of Wales and Monmouthshire 2,594,000 (2,568,000 in 1939). The pops. of the cos. of England, census 1931 (including co. hors.) were: Bedfordshire, 220,000 (296,000 in 1939); Berkshire, 311,000 (390,000); Buckinghamshire, 272,000 (370,000); Cambridgeshire (including Isle of Ely), 218,000 (160,000); Cheshire, 1,088,000 (1,185,000); Cornwall, 318,000 (328,000); Cumberland, 263,000 (283,000); Derbyshire, 757,000 (779,000); Devonshire, 733,000 (781,000); Dorsetshire, 239,000 (283,000); Durham,

1,486,000 (1,378,000); Essex, 1,755,000 (1,745,000); Gloucestershire, 786,000 (874,000); Hampshire (administrative co. of Southampton), 1,103,000 (1,036,000) including Isle of Wight, 88,000 (93,000); Herefordshire, 112,000 (133,000); Hertfordshire, 401,000 (567,000); Huntingdonshire, 56,000 (65,000); Kent, 1,219,000 (1,444,000); Lancashire, 5,039,000 (4,829,000); Leicestershire, 542,000 (580,000); Lincolnshire, 625,000 (646,000); London, 4,397,000 (3,022,000); Middlesex, 1,639,000 (1,888,000); Monmouthshire, 435,000 (411,000); Norfolk, 505,000 (529,000); Northamptonshire, 361,000 (359,000); including Soke of Peterborough, 52,000 (53,000); Northumberland, 757,000 (730,000); Nottinghamshire, 713,000 (751,000); Oxfordshire, 210,000 (258,000); Rutlandshire, 17,000 (20,000); Shropshire, 244,000 (266,000); Somersetshire, 475,000 (556,000); Staffordshire, 1,431,000 (1,482,000); Suffolk, 401,000 (327,000); Surrey, 1,181,000 (1,118,000); Sussex, 770,000 (1,040,000); Warwickshire, 1,535,000 (1,644,000); Westmorland, 65,000 (75,000); Wiltshire, 303,000 (346,000); Worcestershire, 420,000 (477,000); Yorkshire, 4,389,000 (4,463,000); divided between E. Riding, 483,000 (471,000); N. Riding, 469,000 (487,000); W. Riding, 3,352,000 (3,408,000); York City, 85,000 (97,000).

The pops. of the cos. of Wales, including the co. hors. were: Anglesey, 49,000 (51,000); Brecknockshire, 58,000 (54,000); Cardiganshire, 55,000 (58,000); Carmarthenshire, 179,000 (174,000); Carnarvonshire, 121,000 (134,989); Denbighshire, 158,000 (171,000); Flintshire, 113,000 (135,000); Glamorganshire, 1,226,000 (1,173,000); Merionethshire, 43,000 (45,000); Montgomeryshire, 48,000 (49,000); Pembrokeshire, 87,000 (85,000); Radnorshire, 21,000 (20,000).

The pops. of tns. exceeding 100,000 in England and Wales: London (City and Administrative County), 4,397,000 (3,022,000); Birmingham, 1,002,000 (995,000); Liverpool, 856,000 (733,000); Manchester, 786,000 (621,000); Sheffield, 512,000 (502,000); Leeds, 483,000 (457,000); Bristol, 397,000 (424,500); Kingston-upon-Hull, 313,000 (263,200); Bradford, 298,000 (273,900); West Ham, 294,000 (201,000); Newcastle-upon-Tyne, 283,000 (218,000); Stoke-on-Trent, 277,000 (264,500); Nottingham, 269,000 (264,800); Portsmouth, 249,000 (199,800); Leicester, 239,000 (261,300); Croydon, 233,000 (197,400); Cardiff, 224,000 (227,600); Salford, 223,000 (166,300); Plymouth, 308,000 (202,200); Sunderland, 186,000 (165,900); Willeiden, 181,000 (142,000); Bolton, 127,000 (163,800); Southampton, 176,000 (160,000); Coventry, 178,000 (224,000); Swansea, 165,000 (162,000); Tottenham, 158,000 (113,000); Birkenhead, 148,000 (128,000); Brighton, 147,000 (172,000); East Ham, 142,000 (103,000);

Derby, 142,000 (128,000); Rhondda, 141,000 (119,000); Oldham, 140,000 (120,000); Middlesbrough, 138,000 (129,000); Wolverhampton, 133,000 (143,000); Walthamstow, 133,000 (103,000); Ilford, 131,000 (130,000); Leyton, 128,000 (92,000); Norwich, 126,000 (118,000); Stockport, 126,000 (134,000); Blackburn, 123,000 (109,000); Gateshead, 122,000 (101,000); Southend-on-Sea, 120,000 (127,000); Preston, 119,000 (111,000); Ealing, 118,000 (152,000); Bournemouth, 117,000 (144,000); Hendon, 116,000 (128,000); Huddersfield, 113,000 (125,000); South

in 1920 to 370,000 in 1940. Of this total, there were 65,840 under 5 ac., 166,300 over 5 and under 50 ac., 128,100 over 50 and under 300 ac., and 11,900 over 300 ac.

Cos. with over 30,000 ac. under cultivation for wheat are: Cambridgeshire and Isle of Ely, Essex, Gloucestershire, Hampshire, Hertfordshire, Huntingdonshire, Lincolnshire, Norfolk, Northamptonshire, Nottinghamshire, Oxfordshire, Suffolk, Wiltshire, and Yorkshire; with over 30,000 ac. for barley: Cambridgeshire, Essex, Lincolnshire, Norfolk, Suffolk, Yorkshire, while Cheshire, Cornwall, Cumberland, Devonshire, Durham,



(O. I. Croen copyright)

WALES: THE AVON COLLIERY, IN A TYPICAL INDUSTRIAL VALLEY

Shields, 113,000 (96,000); St. Helens, 107,000 (105,000); Walsall, 103,000 (104,000); Blackpool, 102,000 (157,000).

INDUSTRIES.—Agriculture: The acreage under crops and grasses, excluding rough grazings (4,155,000) for the year 1946 was 23,548,000. Corn crops, 6,837,000 acres; Green crops, 2,645,000; Hops, 21,000; Small fruit, 31,000; Orchards, 270,000; Bare fallow, 287,000; Cloves and rotation grasses, 3,707,000; Permanent pasture, 9,946,000. Sugar beet is chiefly grown in the E. cos.

In 1938 there were in England and Wales, 856,700 horses; 6,849,000 cattle; 13,899,000 sheep; 3,854,000 pigs; and 36,601,000 poultry.

The average number of persons employed each year, both permanent and casual labourers, during the years 1921-9 was 784,670, a decrease of nearly 10 per cent since 1921, and the number of holdings of over 1 ac. decreased from 420,000

Essex, Hampshire, Kent, Lancashire, Lincolnshire, Norfolk, Northumberland, Nottinghamshire, Shropshire, Staffordshire, Wiltshire, and Yorkshire are the largest oats-producing cos. Devonshire, Gloucestershire, Kent, and Worcestershire have extensive orchards, and Kent is famous for its hops and small-fruit growing. The total value of agric. produce in 1937-38 was £223,500,000 and of livestock and livestock products was £154,400,000. £35,300,000 for farm crops, and £33,800,000 for fruit, vegetables, and flowers.

Fisheries.—The E. coast, with its fleets of trawlers fishing in the N. Sea, is the most important; the great port of Grimsby is pre-eminent, but Yarmouth, especially for herrings, and Lowestoft are important. Brixham on the S. coast and the Cornish pilchard-fisheries should be mentioned, and Milford at the head of Milford Haven in Wales transmits large

quantities to inland tns. Oysters are important at Whitstable and the Essex coast. The total quantity of sea fish landed in 1937 was 851,825 (in 1946, 632,888) tons, and the value (excluding shell-fish) was £15,373,373 (in 1946, £28,636,292). The value of shell-fish was £534,297 in 1937. About 3600 sailing vessels and 9200 steam and motor vessels are engaged in the fishing industry. Close on 52,000 persons are employed.

Mining.—Far exceeding all other minerals together coal stands easily first; the largest fields are in Durham, Yorkshire (W. Riding), and Lancashire; Derbyshire, Staffordshire, and Northumberland are also important, while the Glamorganshire fields are unique in the world for their fine, hard steam coal. Anthracite coal is found in the W. half of the S. Wales coalfields. The total ann. production in England and Wales is over 190,000,000 tons, valued at about £180,000,000. The great iron-ore dist. is at Cleveland in Yorkshire (N. Riding), between ten and fourteen million tons being mined annually, and Barrow-in-Furness benefits by the very rich hematite of Cumberland and N. Lancashire. The only coalfield which combines considerable workings in iron-ore is N. Staffordshire. One of the largest known deposits of iron-ore in the world is at Corby, Northamptonshire, where exploitation commenced soon after the First World War. The metal content of the iron-ore mined amounts to 30 per cent, the value being £3,500,000, but the large metal works depend largely for their raw material on imports, especially from Spain, coming to Middlesbrough. Lead, tin, and copper, once extensively mined in Derbyshire for the first and Cornwall for the last two metals, have now ceased to be of importance. A fine china clay is mined in Cornwall: slate is quarried especially in the Lake Dist., but the great centre is Wales. Industrial workers in mines and quarries number about a million, of whom 900,000 are engaged in coal-mining, but these totals have declined by about 200,000 and 153,000 respectively in the past decade.

Textiles. The cotton industry, the greatest in the world, is practically confined to S. Lancashire, to which the raw material is brought through Liverpool, connected by the ship canal to Manchester. The moist atmosphere of the dist. has aided the combination of the most skilled workmen, the machinery for which the acutest inventors are constantly devising improvements, and the ever-ready coal supply for power which estab. Lancashire as the centre of the world's cotton industry in the early nineteenth century. Oldham and Bolton are the chief spinning tns., the latter being the fine-cotton spinning centre. Preston, Burnley, Blackburn, Bury, and Rochdale are weaving tns., while Rochdale is also a woollen tn., being important for flannel manuf. The woollen industry, however, centres in the W. Riding of Yorkshire round Leeds. Bradford is important for worsted manuf., and also has silk, velvet, and plush mills. Near Bradford, on the

Aire, is the model tn. of Saltaire, built by Titus Salt in 1853, with its alpaca works. Halifax, in the Calder valley, makes lighter worsteds and baizes, and has a large carpet-making industry. The Colne valley is a busy woollen dist., and Huddersfield is noted for fancy cloths. Heavier woollens are manufactured round Dewsbury and Batley, the former being the rag mkt. of the world, where old wool materials are reconditioned. Wakefield, Barnsley, Kelghley, Morley, Heckmondwike are all woollen tns. The industry has spread into Lancashire, at Rochdale, Aston, and Glossop, while Denton and Stockport specialise in felt hats and velours. The Yorkshire wool industry has almost eclipsed the long-estab. manuf. of 'West of England cloth,' but this is still made at Stroud (Gloucestershire) and Trowbridge and Bradford (Wiltshire). The silk industry is also of long standing, especially in parts of Derbyshire, Staffordshire, and Cheshire. The artificial-silk industry is mostly run in connection with cotton and wool, but is widely distributed. Jute fabrics and yarns are manufactured at Barnsley. Textiles constitute about 37 per cent of the value of native products exported from England, the value of cotton and wool yarns and manufs. exported being (1939) £68½ and £35½ millions respectively. By the Census of Production, 1921, cotton yarn was valued at £187,000,000, piece goods at £157,000,000, and miscellaneous cotton manufs. at £13,000,000, but after that date the industry which employs 500,000 people entered on a period of depression and to the decennial period 1931-40 the value of exports fell by £67 millions, the percentage of insured persons unemployed in 1938 being 29.8.

Iron and Steel.—The iron industry first centred in the Forest of Dean and in the Kentish Weald, where raw material and wood fuel were easily obtainable. When wood was replaced by coal, iron works were set up near the coalfields in the Midlands and S. Wales. With the insufficiency of domestic supplies of raw material, smelting in the Midlands was largely replaced by the manuf. of articles in iron and steel, and two tns.—Birmingham and Sheffield—have attained pre-eminence, the former being associated with all kinds of metal ware, the latter more especially with cutlery. With the discovery of the Cleveland deposits, Middlesbrough (N. Yorkshire) became one of the great iron-smelting dists., others being S. Durham, S. Wales, N. Lancashire, Northamptonshire, and Cumberland, the last depending largely on Sp. ores. Production of pig-iron is valued at £40,000,000 and of steel at £180,000,000. The average output of pig-iron per annum is between 6,000,000 and 7,000,000 (in 1938, 8½ million) tons, of steel 12,000,000 tons.

Allied to the iron industry is that of ship-building. When iron replaced wood as the material for ships, the industry shifted from the Thames to the Clyde, but in England the most active shipyards are on the N.E. coast, especially at Newcastle-on-Tyne, Sunderland on the Wear,

Stockton and Middlesbrough on the Tees, and Hartlepool. These yards account for some 500,000 tons of shipping a year, while smaller yards are in existence at Hull, Southampton, Barrow-in-Furness, and Liverpool.

Steam engines and rolling-stock are made at Manchester, Birmingham, and Newcastle, while the former L.M.S. Railway has works at Crewe, the G.W.R. at Swindon, the S.R. at Eastleigh near Southampton, and the L.N.E.R. at Doncaster and Darlington. The manuf. of agric. machinery is carried on in the corn dist., especially at Lincoln, Grantham, Norwich, and Ipswich.

Other Industries.—The presence of both clay and coal has made Staffordshire the centre of the pottery industry, and the pottery ins. of Burslem, Tunstall, Hanley, Fenton, Langton, and Stoke are now incorporated in the co. bor. of Stoke-on-Trent. The industry is very centralised, but Worcester and Derby have long been famous for porcelain, while Stourbridge makes fireclay. Glass is also made near the coalfields, at Birmingham, S. Lancashire, and Worcestershire. In connection with the salt deposits of Cheshire and S. Durham, alkali and chemical works operate in the valleys of the Weaver and Wenlock, Cheshire, also at St. Helens in Lancashire, and Flint in Wales. Paper-making requires abundance of water, and is carried on in the Thames estuary, especially at Gravesend. The manuf. of dyestuffs is also a Thames industry at Silvertown, and on the Mersey and Manchester Ship Canal. Chair-making is a local industry among the beech woods on the Chiltern Hills. Leather-work is widespread, more especially at Northampton for shoes, Leicester, Stafford, and Walsall. Lace-making by hand is an old industry, still pursued at Honiton, S. Devonshire.

COMMUNICATIONS.—*Railways*: There are 37,083 single-track miles of Eng. and Welsh railways and 20,205 route m. During the First World War, the railways were under gov. control, and were decontrolled in 1921. By the Railway Act of that year 120 railway companies were amalgamated into four systems: (1) the Southern Group, (2) the Western Group, (3) the North-Western, Midland, and West Scottish Group, and (4) the North-Eastern, Eastern, and East Scottish Group. The first group, organised as the Southern railway, had a length of line of 2156 m., and served the S. coast and S.W. of England from Waterloo, London, and also the S.E., combining the former London, Brighton and South Coast railway from Victoria and South Eastern and Chatham railway from Charing Cross, having important channel connections, linking England with the Continent. The Great Western railway, combined with the Cambrian railway and local S. Wales lines, constituted the second group, running from Paddington, London, to Plymouth and Penzance, and through Bristol and the Severn Tunnel to S. Wales and Fishguard; also N.W. through Birmingham to Birkenhead. Its length of line

was 3785 m. The third group was the largest, organised as the London, Midland and Scottish railway, having 6941 m. of line. It served the industrial Midlands and Scotland, and combined the former London, North-Western and Midland railways from Euston and St. Pancras, London, together with the provincial Lancashire and Yorkshire railway, N. Staffordshire railway, Caledonian railway, and others, comprising thirty-five companies in all. The fourth group covered the coal, iron, and ship-building areas of the E. part of England, and extended into Scotland. Organised as the London, North-Eastern railway, it had 6369 m. of line, and included the six trunk lines of the former Great Northern from King's Cross, London, the Great Eastern from Liverpool Street, and the Great Central from St. Marylebone with the North-Eastern from York and the North British from Edinburgh. By the Transport Act of 1947, the four Main Line Railways, together with various joint lines and small railways, passed into the ownership of the Brit. Transport Commission, under the title of 'British Railways.' The six following regions were then formed: (1) The London Midland Region (L.M.S.) with headquarters at Euston, (2) The Western Region (G.W.R.) with headquarters at Paddington, (3) The Southern Region (S.R.) with headquarters at Waterloo, (4) The Eastern Region (S. area of the L. and N.E.R.) with headquarters at Liverpool St., (5) The North Eastern Region (N.E. area of the L. and N.E.R.) with headquarters at York, and (6) The Scottish Region (corresponding to the Scottish systems of the L.M.S., and the L. and N.E.R.) with headquarters at Glasgow.

Canals.—Many of the chief ports of the country are situated on riv. or on riv. estuaries. Liverpool on the Mersey estuary; Bristol with its ports at Avonmouth and its harbour up the R. Avon; London, with its network of docks on each bank of the Thames; the Humber, with Hull; and the Tyne, with Newcastle, need only be mentioned. The Manchester Ship Canal was opened in 1894, and is 35½ m. in length, being an artificial arm of the sea, making Manchester the fourth port in the United Kingdom. The canal system, which was highly developed during the latter part of the eighteenth century, receded in importance on the coming of the railways, and has, comparatively speaking, been neglected, a neglect which has been enhanced by the fact that many canal lines were owned by railway companies. The Humber and the Mersey are connected by the Aire and Calder canal from Goole to Leeds, thence by the Leeds and Liverpool canal. Sheffield is connected with the Trent by the Sheffield and S. Yorkshire canal, thence to the potteries dist. by the Trent, Mersey, and Bridgewater canals. Birmingham and dist. is also served by a canal system leading to the Severn and Trent. The Grand Union canal draws traffic from London to the N.

and the Midlands. The total length of canals in E. and W. is 3641 m., but the total length of canals which are in use is much less (*see CANAL*). Improvements, such as the introduction of diesel-engined motor barges and rebuilding of locks and bridges after 1918 brought about a certain revival in long-distance traffic on the canals, but it is still true to-day, as in 1909, that the bulk of the canal traffic is local. Coal is still the main cargo and, in 1938, it supplied about half of the 13 million tons of canal traffic. The Grand Union Canal has a large trade in coal. Sugar beet is carried by canal in E. Anglia; the Weaver Navigation transports salt, and timber is the main item on the Lea and Stort Navigation. Most of the canals in England and Wales are under the control of the Brit. Transport Executive (*see also under CANAL*).

Roads.—England is suitable geographically for road-making, and good materials are abundant. With the 'Calamity of the Railways' the upkeep of the roads was neglected, but with the coming of the motor-car and the lorry, improvement of the highways became imperative and at the present time the cost of maintaining and rebuilding roads borders on £61,000,000 annually. This cost is borne by the co. councils, which by the Local Gov. Act, 1929, are the Highway Authorities for all co. roads, i.e. classified roads and rural roads, and by the bor. and urban councils, who are responsible for all roads within their areas other than co. roads. Large annual grants for road maintenance are made from the Road Fund, administered by the Minister of Transport. (*See also HIGHWAYS*.) Heavy transport by road rather than by rail has increased, and motor-coach routes connect up the main tns., while the motor-omnibus provides a local service in tn. and country. Progress in road construction has been made with the arterial roads such as the Great W. Road and the new Dover Road; their main features are width, comparative straightness, and a smooth surface, while their monotony is relieved by the planting of trees. There are now 153,000 m. of road in England and Wales, of which 27,000 are Class I, 17,000 Class II; 80 per cent unclassified.

HISTORY.—*See ENGLISH HISTORY*; **GREAT BRITAIN**.

LOCAL GOVERNMENT AND ADMINISTRATION.—For purposes of local gov. England and Wales are divided into administrative cos., of which there are sixty-two, following roughly the geographical and territorial cos., but London forms a co. by itself, and Yorkshire and some other cos. are split up into two or more administrative cos., while some smaller cos. are grouped. The cos. are divided into rural and urban dists. governed by dist. councils, and the pars. of the rural dists. have par. councils or par. meetings. Outside the co. authority except for certain purposes, are the bors., some being entirely independent. First are the co. bors. which have all the powers of a co. council and are independent. They are the old 'cities and counties,'

such as Bristol, Nottingham, etc., and tns. over 50,000 in pop. which have obtained the rank of a co. bor. from the Local Gov. Board. Non-co. bors. are of two classes, old quarter-sessions, bors. of 10,000 pop. and over, and of under 10,000 pop., with varying independence of co. rating, etc.

SOCIETY, RELIGION, ETC.—Social distinctions in England depend almost entirely on occupation, and there is no homogeneous 'upper' nor 'middle' class. The former landowning class has been largely dispossessed since the First World War, and big estates have been broken up. The only class with any cohesion is the wage-earning class, which, together with all other employed persons, including salaried and professional, numbers 90 per cent of the total occupied pop., numbered at 18,853,000 in England and Wales (census of Occupations, 1931). Of this total about 13,247,000 were men and 5,606,000 were women (over 14 years of age in both cases). Agric. workers numbered 1,172,000, mining workers, 993,000; factory workers, 5,787,000; transport workers, 1,635,000; professional 716,000; clerks and typists, 1,375,000; commerce, finance and insurance workers, 2,071,000; 'personal service' workers, 2,390,000; and sport and entertainment workers, 113,000.

Occupational organisation—including trades unions, professional associations, scientific bodies, etc.—are a marked feature of social structure. Club-life of a more recreative character is becoming increasingly popular, and there are in England and Wales nearly 12,000 Registered Clubs, political, social, athletic, etc., with an active membership of nearly four million.

The estab. religion in England and Wales is the Church of England, numbering 2,701,000 communicants. The Welsh Church was disestablished in 1920. Other large denominations are the Wesleyan Methodist and the Congregationalist, counting over 400,000 members each, while the actual Rom. Catholic pop., children and adults, is over two million. Of Jews there are about 300,000. *See also ENGLAND, CHURCH OF*; **ETC.**

EDUCATION.—*See EDUCATION*.

Bibliography.—**GENERAL.**—C. B. Fawcett, *Provinces of England*, 1919; A. Demangeon, *Les Îles britanniques*, 1927; W. R. Inge, *England*, 1927; C. E. Robinson, *England*, 1929; W. Dibelius, *England*, 1930; J. A. Williamson, *The Evolution of England*, 1944.

SCENERY.—Lord Avebury, *The Scenery of England*, 1901; H. V. Morton, *In Search of England*, 1927, and *In Search of Wales*, 1932; H. F. Piehler, *England for Everyman*, 1933, and *Wales for Everyman*, 1935; E. Vale, *The World of Wales*, 1935, and *Seas and Shores of England*, 1936; T. Sharp, *English Panorama*, 1936; J. H. B. Bell, E. F. Bozman, and J. Fairfax Blakeborough, *British Hills and Mountains*, 1935; Odhams Press, *The British Heritage*, 1948; Ruth Manning-Sanders, *The West of England*, 1949; W. G. Hoskins, *Midland England*, 1949.

POPULATION: H. J. Fleure, *Races of England and Wales*, 1923; A. C. Saunders and C. Jones, *Survey of Social Structure of England and Wales*, 1927; Eva Hubback, *The Population of Britain*, 1918; P. Quennell (ed.) *Mayhew's London Labour and the London Poor* (1861), 1949.

INDUSTRIES: R. Cragg, *Anvil and Loom*, 1926; C. D. Chisholm, *Handbook of Commercial Geography*, 1928; D. Hartley and M. M. Elliott, *Life and Work of the People of England*, 1925-31; W. D. Wright, *Life and Commerce in Great Britain*, 1938.

COMMUNICATIONS: W. T. Jackman, *The Development of Transportation in Modern England*, 1916; R. H. Thornton, *British Shipping*, 1939; C. Bounphrey, *British Roads*, 1942; J. W. Williamson, *Railways Today*, 1942.

LOCAL GOVERNMENT AND ADMINISTRATION: E. Jenks, *Outlines of English Local Government*, 1930; J. P. R. Maud, *Local Government*, 1932; H. J. Laski, W. I. Jennings, and W. A. Robson (ed.), *A Century of Municipal Progress*, 1935-1935.

SOCIETY, RELIGION, ETC.: R. Kircher, *Fair Play*, 1928; W. Notestein, *English Folk: a Book of Characters*, 1938; British Council, *British Life and Thought*, 1941; E. Barker, *Britain and the British People*, 1942; R. Shahani, *The Amazing English*, 1948; R. Lewis and A. Maude, *The English Middle Classes*, 1949.

English, Church of, a title which, as *Ecclesia Anglicana*, first appears in Magna Charta (1215), to denote the body of orthodox Christians in communion with the bishops of the country. The name becomes, however, a particular title of this body, as distinct from the Rom. Communion, during the Reformation period, when, acting under royal pressure through its Convocations, it freed itself from the papal yoke. The Eng. Church was probably founded towards the end of the second century B.C., but was almost entirely swept away by the Saxon invasion. At the end of the sixth century, a mission was sent from Rome by Pope St. Gregory the Great, which re-established the faith in Britain. This mission was headed by Augustine of Canterbury. The hist. of the medieval Eng. Church contains a continuous series of protests against papal extortions and encroachments, and in the reign of Henry VIII. political events brought this general dissatisfaction to a head. Convocation declared Henry to be supreme head of the C. of E. (1533), while at the same time the king declared that he claimed no spiritual power. The process of limiting the papal power terminated in 1534 when Convocation declared that the bishop of Rome had no more authority in England than any other foreign bishop. So far traditional doctrine had been preserved, but the Books of Common Prayer, successively authorised by Cranmer under Edward VI., introduced the Reformed teaching into the C. of E. Under Mary the realm was reconciled with Rome by Cardinal Reginald Pole, Cranmer's successor as archbishop of Canterbury. Elizabeth reversed this policy and the

severance became final in 1570, when Pius V. excommunicated the Queen, and forbade any of his adherents in England to remain in communion with the Eng. Church. In spite of the disorders of the time, the Eng. Church maintains that it succeeded in retaining the auct. ministry and the auct. faith. Rom Catholics deny both these things, saying that archbishop Parker of Canterbury was not validly consecrated, and that the C. of E. adopted the current Protestant doctrines. Against this, however, Anglicans quote certain great continental historians, such as Bossuet and Dollinger. The doctrine of the C. of E. is to be found in the three creeds and the Book of Common Prayer, including the Thirty-Nine Articles. In England and Wales there are forty-three dioceses, administered by seventy-six bishops assistant bishops and bishops suffragan. Thirty of these dioceses form the prov. of Canterbury and thirteen the prov. of York. See also CHURCH. See H. Wakeman, *Introduction to the History of the Church of England*, 1898; A. Jessopp, *A Short History of the Church of England* (first pub. as 'A Penny History of the Church of England', 1902), 1922; Margaret Dean-ley, *A History of the Medieval Church*, 1925; H. Henson, *The Church of England*, 1940; R. Lloyd, *The Church of England in the Twentieth Century*, 1947; C. F. Fisher, *Church and State in England*, 1949.

England, New, see NEW ENGLAND.

Englewood, city of Bergen co., New Jersey, U.S.A., 1 m. W. of the Palisades of the Hudson R. It is a residential suburb of New York, from which it is 14 m. distant. Pop. 18,000.

English Art. Medieval Art.—Medieval E. A. finds expression chiefly in Gothic architecture, and in sculpture as applied to eccles. buildings. The Fr. Gothic style spread throughout Europe through the monasteries, and it was natural that the variety of historical conditions and ideals, no less than of climate and materials in the different countries into which the style spread, should lead to the formation of a new national style in each, though all manifest a common origin. Just as the pointed arch, so often applied in Gothic art, appears for the first time in France, though derived by France through the Arabs from Persian art, so the ogival vault, a fundamental principle of Gothic art, appears for the first time in England, whence soever it originated. Durham Cathedral presents the oldest example of it. In developing a national style, Eng. Gothic reveals a definite kinship with the auct. Norman buildings, notably in the massive, fortress-like structure, flat-topped tower, and choir enclosed by a square roof. Early Eng. Gothic pillars are somewhat distinctive in that they consist of a central cylindrical pillar surrounded by other pillars detached from it from capital to base, and numerous blind pointed arches along the walls, designed to alleviate the mass of the edifice. The typical roof ceiling is in wood resting on corbels, while the turrets are crowned by battlements. In the decorative sphere, the changes introduced by E. A. were the im-

mense window in the choir, the ornamentation of the vaults with star ribs—as, *e.g.*, in York Minster, Lichfield, Exeter, and Hereford Cathedrals—and flamboyant decoration generally. During the fifteenth century Eng. Gothic art abandoned the flamboyant or fantastic for a simpler and more restrained style of decoration, as exemplified in the Tudor depressed arch; while the inner roof was generally of painted wood with stone-like stalactites pendent from the ribs. Early Eng. sculpture is noteworthy for the fancy which informs its realism. The exterior of the Eng. cathedrals show little of this humorous fancy, but in the interior remarkable portrait-statues are to be found between arches, below the windows of the apse, on the wall plinths, and, above all, on the tombs. Examples are to be seen in Westminster Abbey and in the cathedrals of Lincoln, Canterbury, Salisbury, and Worcester.



W. F. Mansell

HANS HOLBEIN
A self-portrait

English Painting.—Few examples survive of Eng. medieval painting. It is known that in England, as elsewhere in Europe, painting flourished under the aegis of the Church. National characteristics did not begin to emerge until the seventh and eighth centuries, and found expression particularly in the illuminated manuscripts of the period. The schools of Winchester and Canterbury produced manuscripts which were esteemed throughout Christendom. The decoration of churches encouraged wall painting and panel painting. In the thirteenth century painting flourished under the patronage of Henry III., who made London a centre

of art. The mural paintings of the Palace of Westminster, now destroyed, were outstanding examples of Eng. painting of this period. In the fourteenth century E. A. declined as a result of the Wars of the Roses, and the decline was further hastened by the Reformation. Many early works of art were destroyed, and this iconoclasm continued into the seventeenth century. The reign of Henry VIII. virtually put an end to church painting, and it may be said that painting, particularly portrait painting, survived only through the influence and example of Hans Holbein. The best artists of the time were, like Holbein, visitors from the Continent. In Elizabeth's reign, however, Eng. painting gained a native excellence in the work of the miniaturists, notably Nicholas Hilliard (1537-1616), Isaac Oliver (1564-1617), and his son, Peter Oliver (1594-1646).

In the Stuart period Eng. painting again owed its renewed impetus to the influence of a foreigner, Sir Anthony Van Dyck, who settled in England in 1620 at the age of twenty-one, becoming court painter to Charles I. Among his successors were William Dobson (1610-46), the Cavalier painter, and Robert Walker (1600-59), who painted portraits of Oliver Cromwell and other Puritan leaders. During the Commonwealth and after the Restoration the influence of foreign artists working in England continued. First among them was the Dutchman, Sir Peter Lely and later Sir Godfrey Kneller who came to England from Germany in 1674. There are few Eng. painters of the period to put beside Lely, except John Riley (1646-91) and Robert Streater (1624-80), whose mural paintings were notable in an age of portraiture. In 1711 Kneller founded a school which was the precursor of the Royal Academy, founded more than fifty years later when, in 1760, Sir Joshua Reynolds became its first president. Kneller's facile production debased the tradition of Van Dyck, but the ascendancy of fashionable portrait-painting was challenged by the genius of Wm. Hogarth (1697-1764), who by the realism and sincerity of his descriptive scenes from contemporary life strongly influenced the development of indigenous art at a time when it had sunk to shallowness and artificiality. His axiom that the only school was that of nature needs no emphasis to-day. Yet, though it was scarcely recognised in his time, it was destined to become the very keynote of E. A., and the measure of the debt to his work is to be gauged accordingly.

Gainsborough (1727-88) is regarded as the 'father of modern Eng. painting.' A rival of his great contemporary, Reynolds, as a fashionable portrait painter, he excelled in landscape painting. Landscape which is the great glory of Eng. painting was estab. in England by the work of foreign artists, but Richard Wilson (1713-82) who studied for some years in Rome gained a reputation abroad which brought greater recognition to landscape painting in his own country although he himself was on the whole neglected. Whereas

Wilson painted nature in the grand manner, Gainsborough brought to his landscapes a more personal and romantic feeling. He had not only a deep and intimate knowledge and perception of natural subjects, but also a delicate touch as a painter and great power as a colourist. Reynolds was greatly influenced by It. painting, and his visit to Italy in 1749 was a landmark in his life. Gainsborough, who never left England, was influenced more by the Dutch painters and by Rubens. A successful follower of Gainsborough was George Morland (1763-1804),

whether the realism of Constable was more highly favoured than the idealism of Turner or the pseudo-classicism or romanticism of Lord Leighton (1830-1896). But certainly the nature painters have endowed Eng. painting with a more permanent impression than have the great portrait painters of the eighteenth century, whose classicism was not followed by their successors. Constable was the first painter to see that nature ignores conventions of beauty and propriety—a negative principle which lies at the root of all naturalistic art to-day. His stormy



CONSTABLE'S 'FLATFORD MILL'

best known as a landscape painter. He also painted sporting and animal pictures, a genre which with the outstanding example of George Stubbs (1724-1826) enjoyed a vogue in the eighteenth and nineteenth centuries with the work, besides Stubbs and Morland, of James Ward (1769-1859), John Herring (1795-1865), Sir Edwin Landseer (1802-73), Thomas Cooper (1803-1902), and George Mason (1818-72).

With Gainsborough, Constable (1776-1837) and Turner (1775-1851) stand at the beginning of modern art in England. The influence of Constable as a nature painter was profound, and made itself felt on the Continent, especially in France, where he may be said to have been the true inspiration of the Barbizon school led by Millet and Corot. All through the Victorian period of E. A. both academicism and classicism vied with nature in popular favour, and it would be difficult to say

skies and leaves glittering in sunlight reveal the innovator in light effects. Turner, who doubtless gained much from others, yet stands alone as the most significant figure in Eng. painting. He is aptly regarded as being in E. A. what Shakespeare is in Eng. literature. His exemplar was Claude Lorraine, but he surpassed the Fr. artist in atmosphere and in breadth of conception, however inferior he was in technique and the qualities of form. Turner's dreams of classic Italy and Greece are for many the only Italy and Greece of old; and the romantic schools of the Continent are the offspring of his art—markedly so in the work of Harpignies and Pointelin. Among nature painters Turner is unique, conveying through a novel and marvellous use of colour his individual vision of light; and in him E. A. has affinities with Rembrandt before him and with Monet after. Mention may also be made here of Richard

Parkes Bonington (1801-28), a painter of great promise whose style, learnt in France, was itself an influence on Fr. painting. Of the same period as Constable and Turner was John Crome, who founded the Norwich Society of Artists in 1803. The dominant characteristic of this school of painting was sincerity and freshness of outlook. If Eng. painting owes less to him in the new naturalistic and impressionist interpretation of familiar nature than to Constable and Turner, there are beauty and meaning in his work, and more of poetic quality in it than in his master, Hobbema, whose traditions he carried on, however unconsciously, in England. Associated with Crome are the younger Crome (1794-1842), John Cotman (1782-1842), James Stark (1794-1859), George Vincent (1796-1836), and John Ladbroke (1803-79). Of these, Cotman is especially noteworthy for his influence in the development of the art of water-colour painting in England, his work in this medium being supplemented by a group of contemporary Eng. artists, including John Robert Cozens (1752-87), Thomas Girtin (1775-1802), Copley Fielding (1787-1855)—in marine studies—Samuel Prout (1783-1852)—in architectural work—and David Cox (1793-1859), the group being known as 'the Eng. School' and attaining a world importance in the work of Turner. In the strange visions of the 'other world' of Blake (1757-1827), we have an original vein of imaginative art, and so inimitable as to make him the great pictorial mystic of the world. Though in form he is often grotesque the reverse of naturalistic, even to inaccuracy of outline as in his picture of the Resurrection, he is the first of Eng. poet painters. Of the same great period of E.A., striking an equally distinctive note, are Gillray (1757-1815), and Rowlandson (1766-1827), caricaturists of manners and customs, whose tradition was carried on by Cruikshank (1792-1878). In portrait painting Reynolds is the Eng. classic. He had a wide knowledge of It. painting, and from the work of Cressi and others he no doubt formulated his maxim that 'it is not the eye, but the mind which the painter of genius desires to address.' Hence he painted his sitters not in fashionable dresses, as being 'too particular and individual,' but in non-committal costume—thus his portrait of Mrs. Siddons is in some ways reminiscent of Michelangelo's 'Isaiah.' Besides Reynolds, the great names in E. A. are those of Romney (1734-1802), John Hoppner (1758-1810), and Sir Thomas Lawrence (1769-1830), whose brilliant work marks an epoch in E. A. and the close of the artificial tradition. Other names of this period important in E. A. are those of Sir David Wilkie (1785-1841) and William Etty (1787-1849), both popular genre painters. Mention must also be made of William Northcote (1746-1831) and John Opie (1761-1807), both of whom painted historical pictures in the grand manner which was the vogue in the early nineteenth century. Thomas Stothard (1755-1834) in the illustration of the novels of

Fielding, Richardson, Sterne and Smollett initiated a revolution in book illustration which was later to develop into one of the most striking art movements of the century.

Eng. painting during the second half of the nineteenth century was dominated by the Pre-Raphaelite Movement, named from the Pre-Raphaelite Brotherhood which was formed in 1848 by Rossetti (1828-82), Holman Hunt (1827-1910), and Millais (1829-1896). Other artists later joined the Brotherhood while from the start Ford Madox Brown (1821-93) was associated with it. (See PRE-RAPHAELITE BROTHERHOOD.) The aim of the movement was a revolt from the 'grand style' and a return to simplicity and accuracy of observation. At first ridiculed, the style of the Pre-Raphaelites produced a host of popular imitators, and later a 'second' movement started in which among painters the names of Sir Edward Burne-Jones (1833-98) and Walter Crane (1846-1915) may be mentioned. Millais later in life became a prominent figure in the academic art of the day. G. F. Watts (1817-1904), whose paintings expressed the moral fervour of his ideas, was also accounted one of the foremost painters of his day. He was also a notable portrait-painter. Alfred Stevens (1818-75), known in his lifetime more as a sculptor and designer, is now also recognised as a painter of importance. With Millais and his imitators painting was degenerating into a method of story-telling. In pronounced reaction to this came the work of James McNeill Whistler (1834-1903), an Amer.-born artist who brought to England the influence of the Fr. impressionists. His own work with its emphasis on form, colour, and tone affected the course of Eng. painting. Eng. Impressionism, deriving from Constable and Turner as much as from Fr. artists, found expression in the work of the members of the New Eng. Art Club, founded in 1886. Wilson Steer (1860-1942), Sir George Clausen (1852-1944) and Sir Charles Holmes (1868-1936) are three among the many notable names in this connection. They are celebrated particularly for their landscape work, while among portrait painters John Sargent (1856-1925), an Amer. who painted in England, and a romantic Impressionist, combined psychological penetration with considerable technical skill. Also under the heading of Impressionism may be classed the work of two other distinguished painters—Walter Sickert (1860-1942) and Augustus John. John is a great romantic artist who in his later work has been influenced by the Fr. Post-Impressionists, Seurat and Cézanne. The first Post-Impressionist exhibition in England was held in 1910. The classical ideal of the Post-Impressionists in depicting the relation of forms in a structural sense became part of the achievement of the major Eng. artists of the twentieth century of whom Duncan Grant is a foremost example. In particular, the new style was pressed into the service of those painters who wished to express their experience gained in the First World War.

C. R. W. Newinson, William Roberts, Henry Lamb, Stanley Spencer, Eric Kennington, and the brothers Paul and John Nash were not satisfied with representational art, whether romantic or naturalistic but were intent on using their considerable descriptive powers to portray their moral apprehension of life. Wyndham Lewis was one of the few Eng. artists to be directly affected by the Cubist movement into which Post-Impressionism on the Continent developed. Many of Paul Nash's formal, structural paintings also show Cubist influence. He was the moving spirit among a number of artists who in 1933 formed themselves into a group, named 'Unit One,' with the aim of making design as a 'structural pursuit' and imagination the keynote of Eng. painting. The years between the two World Wars produced a flourishing display of talent among Eng. artists, a development which the Second World War has enhanced rather than diminished. Apart from the artists mentioned above, there are numerous painters whose work has influenced the trend of modern Eng. art, and who deserve more detailed reference than can be given here. Among them are Charles Conder, Henry Tonks, Charles Shannon, Charles Ricketts, Glyn Philpott, Sir Frank Brangwyn, J. B. Yeats, Sir W. Nicholson, Sir W. Rothenstein, Sir William Orpen, Sir Alfred Munnings, Mark Gertler, James Gunn, Dame Laura Knight, and of a newer generation Graham Sutherland, Matthew Smith, John Piper, and Victor Pasmore.

English Architecture.—The change from the Gothic period to the Renaissance began in England in the opening years of the sixteenth century, the transition being gradual from Perpendicular Gothic, through Tudor and Jacobean Renaissance styles, to the developed work of Inigo Jones and Wren. Even famous buildings, however, show the old in conflict with the new; e.g. Henry VII.'s Chapel in Westminster Abbey is the first building in Renaissance style, but its vaulting is essentially Eng. Hampton Court, the earliest large building in the new style, owes its decorative detail to ft. workmen, but the fabric to Eng. Half-timbered houses were greatly favoured in Eng. architecture, and the great number of those surviving were built in Elizabeth's reign. The houses of the nobility, however, were less Eng. in tradition, being built in a chaos of styles to suit the whim of the owner, and many owe their ornamentation to Flemings and Gers., e.g. Longleat, Knole Hall, and Hatfield House—all of which are none the less fine and picturesque buildings. Renaissance architecture in England assumes definite shape with Inigo Jones, some of whose finest work is to be seen in the old Royal Palace of Whitehall, the Queen's House in Greenwich Hospital and St. Paul's Church, Covent Garden. Sir Christopher Wren carried on the work of Inigo Jones not only at Greenwich but also at Hampton Court, adapting the style introduced by Inigo Jones to Eng. taste and requirements. Wren was also responsible for a

large number of city churches, notably St. Stephen's, Walbrook; St. Bride's, Fleet Street; and Bow Church, Cheapside—which foreshadow his masterpiece, St. Paul's Cathedral. Other names in Eng. architecture are John Vanbrugh (or Vanburgh) (1664-1726), the architect of Blenheim Palace and Castle Howard; William Kent (1684-1748), famous for the Horse Guards, Whitehall; James Gibbs (1682-1754), architect of St. Martin-in-the-Fields and St. Mary-le-Strand; George Dance (1698-1768), the builder of the Mansion House; and George Dance the younger, who built the old



John H. Stone

THE NAVE OF ST. PAUL'S CATHEDRAL,
LONDON (WREN)

The painting shown is a copy of Holman Hunt's
'The Light of the World'

Newgate Prison. The old classic style of architecture was disappearing in George III.'s reign when Somerset House was built by Sir William Chambers (1726-96). At the beginning of the nineteenth century urban architecture was given a new impetus at the hands of John Nash (1752-1835), who developed the Regency style. He is remembered particularly for the original design of Regent's Street, London (1813) and for the surrounding buildings of Regent's Park (1821). The Gothic Revival which followed is associated with the name of Augustus Pugin (1812-52), who designed a number of churches in medieval style and was the author of the *True Principles of Gothic Architecture* (1841). Notable London buildings of the period in Gothic style are the Houses of Parliament by Sir Charles Barry (1795-

1860), St Pancras Railway Station by Sir George Gilbert Scott (1810-77), the Law Courts by G. E. Street (1824-81), and the Natural Hist. Museum by Alfred Waterhouse (1830-1905). The Classical style of architecture was not, however, eclipsed. The so-called 'Battle of the Styles' resulted in the use of Gothic style mainly for eccles. buildings and Classical style mainly for public and municipal buildings. The distinction was not, however, rigid, and the major architects of the day did not of course restrict themselves to one style or the other. The London Royal Exchange built in 1842 by Sir W. Tite (1798-1873), The Treasury Buildings in Whitehall built in 1846 by Sir Charles Barry, and Euston Railway Station (1847) by Philip Hardwicke (1792-1870) may be mentioned as prominent buildings in Classical style. Other distinguished architects of the nineteenth century were Decimus Burton (1800-81), C. R. Cockerell (1788-1863), W. Butterfield (1814-1900), G. P. Bodley (1827-1907), Philip Webb (1831-1915), J. L. Pearson (1817-97), the designer of Truro Cathedral, J. F. Bentley (1839-1902), the designer of the Rom. Catholic Cathedral of Westminster in Byzantine style, and Sir Arthur Blomfield (1829-99). Outstanding buildings of the twentieth century are Liverpool Cathedral begun in 1903 from the design by Sir Giles Gilbert Scott and the County Hall, Westminster, designed by Ralph Knott (1878-1929). Liverpool Cathedral, a bold, finely conceived work, is interpretative of Gothic style without, however, being an imitation in the manner of the preceding century. Although not erected in England, one of the finest architectural works of the present day may be mentioned here as being the work of Eng. architects—the Viceroy's House and Gov. buildings at New Delhi designed by Sir Edwin Lutyens and the Secretariat building also at New Delhi designed by Sir Herbert Baker. Lutyens (1869-1941) dominated Eng. architecture in the present century. He was also responsible for many country houses which added greatly to the prestige of Eng. domestic architecture. For dwelling-houses the Tudor and Georgian styles have been revived, while Classic and Renaissance style continues to be employed for public buildings. Steel frame construction has resulted in many buildings most characteristic of the twentieth century. Examples are the Port of London Authority Building designed by Sir E. Cooper and completed in 1922; Imperial Chemical House, London, by Sir F. Baines; Bush House, Aldwych, London, by Helmut, Corbett, and Harrison, the Cunard Building, Liverpool, by Willink and Thicknesse; and the Gillette Factory, Isleworth, by Sir Banister Fletcher. With the growth of large provincial towns, civic architecture is perhaps the most distinctive sphere of modern architecture. Cardiff, Swansea, and other towns now have civic centres which must find a place in any account of present-day architecture. In addition to the architects already mentioned, Sir

John Burnet, Sir Aston Webb, R. Atkinson, W. J. Tapper, Ernest Newton, A. R. Powys, Beresford Pite, Lionel Pearson, K. Maufe, H. P. Adams are among the many architects who have contributed notable buildings to the architectural record of the century. The destruction caused by air attack during the Second World War has given an opportunity for replanning and rebuilding, and in this connection mention must be made of Sir Patrick Abercrombie.

English Sculpture after the Renaissance.—The conventional Gothic style in England under the influence of such artists as Torrigiano developed lightness and naturalness, as instanced by the tomb of Henry VII. in Westminster Abbey. The Chapel of St. John the Evangelist to Sir Francis Vane, also in the Abbey, shows strongly the Continental influence. This work has been attributed to Nicholas Stone (1586-1647), the first really notable Eng. sculptor. The monument to Sir George Holles in Westminster Abbey is, however, authentic, as is also the statue of Donne in St. Paul's Cathedral. These monuments show that Stone's treatment, if somewhat heavy, was essentially classic. Caius Gabriel Cibber, father of Colley Cibber, and a pupil of Stone, was the sculptor of the fountains and temples of Chatsworth, the famous home of the Devonshire family. Of the Renaissance period too, was Grinling Gibbons (1648-1720), one of the great names in Eng. sculpture, though perhaps better known for his inimitable wood carving. His figure work is exemplified in St. Paul's Cathedral and other London churches, while the statue of James II. in St. James's Park is one of his best bronzes. Francis Bird (1667-1731) followed the ornate decorative style of Cibber, as in his statue of Queen Anne in St. Paul's Churchyard; but by the beginning of the nineteenth century this style had yielded to pseudo-Gk. purity and achieved little else but cold formalism. No sculptor of distinction emerges in this period, though John Flaxman (1755-1826), the sculptor of the Mansfield monument in Westminster Abbey, Sir Francis Chantrey (1781-1842), and Joseph Nollekens, who executed many good busts, were all well-known. Another great figure in Eng. sculpture is Alfred Stevens (1818-75), some of whose work is not inferior to that of Brunelleschi. His outstanding achievement is the Duke of Wellington's monument in St. Paul's Cathedral, but his decorative work in Dorchester House (now razed) was also brilliant, especially the magnificent fireplace in the dining-room, with its stooping figures of two females in support.

Eng. sculpture of the twentieth century has been influenced by the two great Fr. sculptors, Rodin and Maillol. Their influence is seen particularly in the two most distinguished of Eng. sculptors, Jacob Epstein and Frank Dobson. Both these sculptors excel in portraiture, but Epstein, who ranks as one of the greatest of Eng. sculptors, is also known for his large allegorical stone figures. A school

of modern sculpture devoted to the handling of abstract form has as its leading exponent Henry Moore, and with him may be associated Barbara Hepworth, John Skeaping, particularly in his early work, and Richard Bedford. Modern architecture gives less opportunity for the sculptor than in former times. All the more outstanding therefore are the figures by Epstein and Eric Gill adorning the London Transport Offices in Westminster and Broadcasting House, London, respectively. Eric Kennington is also noted for



British Railways

'NIGHT' BY JACOB EPSTEIN

his architectural sculpture. Marguerite Milward will be remembered for her portraiture, particularly a series of heads representing racial types, while mention should also be made of W. G. Simmonds, G. Bayes, G. Ledward, Alan Durrst, Maurice Lambert, Sargent Jagger, the sculptor of the Artillery Monument, Hyde Park Corner, London, Sir Alfred Gilbert, Charles Wheeler, and Sir W. Reid Dick.

Bibliography.—G. H. Shepherd, *History of the British School of Painting*, 1881; S. and R. Redgreave, *A Century of British Painting*, 1866, 1948; T. Borenius and E. W. Tristram, *English Medieval Painting*, 1927; C. R. Grundy, *English Art in the Eighteenth Century*, 1928; T. E. Welby, *The Victorian Romantics*, 1929; H. C. Baker and W. G. Constable, *English Painting of the Sixteenth and Seventeenth Centuries*, 1930; Charles Johnson, *English Painting from the Seventeenth Century to the Present Day*, 1932; W. Rothenstein, *An Introduction to English Painting*, 1933; R. H. Wilensky, *English Painting*, 1933; B. Denvir, *Modern British Painting*, 1949; C. Marriott, *Modern English Architecture*, 1924; Sir H. Fletcher, *A History of Architecture*, 13th ed., 1946; T. D. Atkinson, *Local Style in English Architecture*, 1948; J. Lees-Milne, *The Age of*

Adam, 1948; D. Pilcher, *The Regency Style*, 1948.

English Association, formed in 1907 to enlist the support of all those interested in Eng. language and literature. Its aims are to promote the recognition of Eng. as an essential element in the national education, and to discuss the various methods of teaching Eng. Membership is open to all and there are numerous branches in the Empire. London office: 3, Cromwell Rd., S.W.

English Bazar, or **Angrezabad**, the prin. tn. of Malda, in the Rajshahi div. of E. Bengal and Assam, India. In 1770 a commercial residency was estab. here. Pop. 14,000.

English Channel (Fr. *La Manche*, the sleeve), the sea between England and France. Its length is about 350 m., and the greatest breadth between Ushant and the Scilly Isles is about 100 m. The average depth is from 20 to 30 fathoms, reaching 60 fathoms at the entrance to the Strait of Dover and as much as 91 fathoms at Hurds Deep. The tides are peculiar, parts of the Eng. coast having a double tide, the effect generally being to cause higher tides on the Fr. coast (42 ft. at St. Germain) than on the Eng. coast (7 ft. at Portland). W. winds are the most prevalent, gales occurring chiefly between Oct. and Jan., and fogs are common throughout the year. See also **CHANNEL TUNNEL**.

English Church Union, see **CHURCH UNION (ENGLISH)**.

English History. The hist. of England begins with the landing of the Jutes on the is. of Thanet, and the settlement of that tribe in the S.E. corner of the is. That the Eng. were unknown to the Britons and were simply called in to beat back the attacks of the N. tribes on the weakened and effeminate tribes of the S., is a theory that cannot well at the present time be held. The official Rom. position of the Count of the Saxon shore points definitely to the fact that the Romans had suffered from the depredations of these tribes, on the outlook continually for land to plunder. Now in 449 they came not to plunder but to settle. From their N. Ger. homes they swooped down upon a Britain which they knew to be defenceless, and determined to make it their home. The Eng. were composed of three tribes, the Angles, the Saxons, and the Jutes; and so thoroughly was the settlement made in Britain, that one at least of these tribes (the Angles) disappears entirely from Germany. Generally speaking, we may say that the Eng. conquest occupied roughly 150 years, was ruthless in its severity, and was to a large extent a conquest of extermination. The Britons were driven gradually to the mts. of the W., and the Eng., assuming the position of conquerors, called them the foreigners, a name preserved at the present time in the name Welsh. The chief settlements were: the Angles in Northumbria (Bernicia and Deira) and the E. dists. of England, N. of the Thames; the Saxons, S. of the Thames and extending for some time, at least, up the valley of

the Severn; the Jutes only in Kent, with a small settlement in the Isle of Wight. The theory that the conquest was due to the inability of the Britons to hold their own against the fresh vigour of the Eng. is true only when judged in the light that the Eng. did ultimately conquer the country, but to hold as a corollary of this that the Britons were weak, effeminate, and easily overpowered is not correct. The conquest occupied 150 years; we have records of many battles slowly contested, and we have evidence that the Britons in the W. were able to hold the Saxons at bay for some considerable time. We have little evidence of the intermingling of the races, although certainly a greater intermingling took place than has been commonly recognised. At the end of the sixth century we can divide Britain into the following large divisions: Northumbria, Mercia, E. Anglia, Kent, and Wessex, with the Brit. kingdoms of Strathclyde, N. Wales, and W. Wales. Obviously, a constant struggle went on between Northumbria and Strathclyde, Mercia and N. Wales, and Wessex and W. Wales. Of the actual hist. of the Eng. conquest we know little. The *Anglo-Saxon Chronicle*, upon which we depend for so much of our information, was not commenced until the end of the ninth century. The heathen Eng. tribes, before the end of the sixth century, left little evidence of their work in Britain, and it is only after the conversion to Christianity, carried out in the S. principally by Augustine (597), and in the N. by the Celtic Church, whose apostle, St. Aidan, did so much, that England's hist. assumes clearer outlines. England was not easily converted, and the kings of Kent and Northumbria were for a long time opposed by the heathen king of Mercia. Wessex drops out of the struggle for some time, being occupied by internal quarrels. It is impossible to follow here in any detail the constant struggles of Mercia, Northumbria, and later Wessex for supremacy. The heathen king, Penda, made the heaviness of his hand felt in the N., only to be finally overthrown at Winwæd (651). For a time the king of Northumbria became the *bretwalda*, that is, the overlord of Britain, a title purely nominal and carrying with it little, if any, authority. In 661 was held the Synod of Whitby, which finally settled that the Eng. Church should follow the rule of Rome and not of Iona. Almost immediately afterwards Theodore of Tarsus became Archbishop of Canterbury, and by his judicious organisation of the church as a national church, he did much to pave the way for an ultimate amalgamation of the Eng. tribes into an Eng. nation. In the meantime, the power of Northumbria had waned, the battle of Nechtansmere had led to the annihilation of the Northumbrian armies, and Mercia under her kings, Ethelbald and Offa, sprang into the foremost position. Under Offa England then took some part in the councils of Europe. The Emperor, Charles the Great, recognised Offa as the king of England, and there began to be fairly constant intercourse between Eng-

land and the Continent. Offa is also said to have built the Great Dyke which protected Mercia from the attacks of the Welsh. With the death of Offa, however, came the overthrow of Mercia, and Wessex assumed the hegemony. Egbert of Wessex may be regarded practically as the first real overlord of England. In turn he conquered or forced to submission all the great kingdoms, and by 825 we may say that he had at least laid the foundations of a united England.

The century which followed was of vast importance to England, since, during the latter half of this century, we get the beginning of the invasions of the Danes, who had already appeared on these shores before the death of Egbert. They had been known even before then; they had probably been a source of danger to the Romans, but now they came in greater numbers, content at first to plunder and retire, but later coming over definitely with a desire to settle in the country. They conquered Northumbria and E. Anglia before they actually attacked Wessex. The early life of Alfred the Great (*q.v.*) was taken up in fighting against this enemy, and this was his first task as king. But Alfred realised that it was impossible to drive them out entirely, and after the treaty of Wedmore (878) he divided England up into Wessex and the Danelaw, and gave that portion of England, N. and W. of Watling Street, to the Danes, on condition of their adopting Christianity. But he also adopted the only real means of preventing fresh incursions by the Danes. He built a fleet which guarded the Channel and the E. coast, and which succeeded in defeating the Danes before they were able to land. By these means Alfred succeeded in keeping peace in the land during the greater part of his reign, and he was thus able to carry out a great number of necessary reforms. But before the end of his reign the attacks of the Danes had again commenced and were continued during the reign of Edward the Elder, who succeeded in establishing his supremacy over the Danelaw, and who, in 921, was recognised as the overlord of the whole of England, and was acknowledged by the Scots and the Welsh. The outstanding name in the period which followed is that of St. Dunstan, who influenced the policy during the succeeding reign. Himself an Englishman, he recognised that it was essential for the two races, Eng. and Dane, to work together, and although he was held by the Eng. to favour the Danes too much, nevertheless, his work was well done and a recognition of the only practical policy. In 978 succeeded Ethelred the Redeless (Unready), and during his reign the Dan. troubles began again. Time after time the country was invaded, but Ethelred, by means of large levies of Danegeld (*q.v.*), bought off the invaders for a time, but they returned only too ready to gain more money so easily, and finally in 1002 Ethelred caused the massacre of the Danes which called down on him the vengeance of Sweyn, and which led to the rule, from 1016 to 1042, of the Dan. kings.

Ethelred fled into exile in Normandy, an exile which had a great effect upon the ultimate hist. of England.

Canute, the first and the best of the Dan. kings, ruled wisely and well. His great scheme was the foundation of a N. empire which should have England as its centre; and although he did not succeed in establishing a permanent empire, he ruled England sternly but well and as a national king. His two sons, Harold and Harthacnut, are notorious, principally for their evil lives, and in 1042, on the death of Harthacnut, the old Saxon dynasty was restored in the person of Edward the Confessor, the son of Ethelred the Redeless. St. Edward the Confessor (*q.v.*) was more fitted to be priest than king, and during his reign the power lay in the hands of Godwin, earl of Wessex, and later of his son Harold. Edward was largely Norman by training, and the Normans were influential at his court. Finally, Wm., duke of Normandy, declared that Edward had promised him the crown, and forced Harold—a chance visitor—to swear an oath to help him to obtain it. Harold did so, but on the death of Edward he was elected king by the witan, and took up arms in the defence of the kingdom. His brother, Tostig, deprived of his earldom of Northumbria, invaded England and fought, together with Harold of Norway, against Harold of England, at Stamford Bridge. The latter was victorious, and turned with his men S. to confront the Normans who had landed in the S. In Oct. 1066 was fought the battle of Hastings, and on Dec. 25 of the same year Wm. was crowned king of England, elected by the witan in Westminster Abbey.

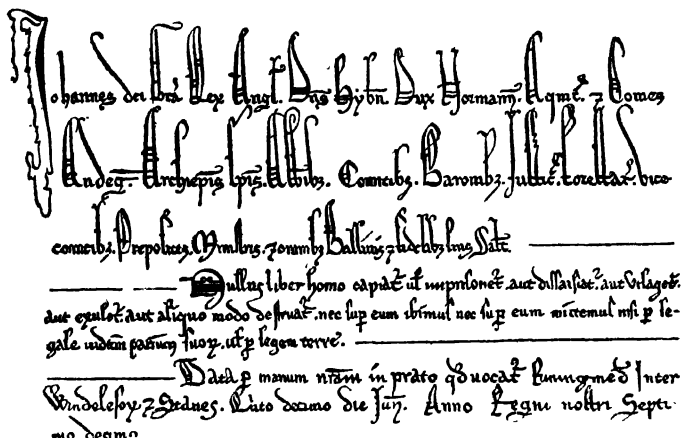
The Norman Conquest was the beginning of the final process in the welding of the Eng. nation into one compact body. The end was still a long way off. Wm. brought in his train numerous Normans, all of whom had to be rewarded by the king with Saxon lands. The Saxons, therefore, sank to the bottom of the social scale, and for long there was no attempt made at the fusion of the races. Wm. was occupied for long with the completion of the conquest of England, and when this had been done he turned his attention to the gov. of the country. He was not only a great warrior, but also a great king. He realised the difficulties of a sovereign with a completeness that was only possible in a man who was both king and feudal vassal. He saw also the limitations of feudalism on the Continent, and he determined to remedy, as far as possible, these defects. There were to be no more great earls who could on occasion adopt regal style. The estates of his followers were scattered throughout the length and breadth of the land. Further, by the Oath of Salisbury, all tenants had to swear allegiance directly to the king, and finally the Domesday survey (*q.v.*) afforded him an unprecedented body of information, which made his grip on the country firmer and more easily maintained. He ruled with a hand of iron, but the heaviness of his hand was

felt by Norman noble and Saxon serf alike. The fusion of Norman and Saxon would have come at a much earlier period but for the possession of Normandy by the Eng. kings. This naturally retarded the process. When Wm. died a dispute arose concerning the succession, but Normandy had been left to Robert (the eldest son), and England to Wm. Rufus. Constant quarrelling took place, and finally Robert handed over Normandy to Wm. as a pledge for a sufficient sum of money to go on crusade, and a promise that whichever of the two died first the survivor should succeed to both dominions (England and Normandy). Unfortunately, during Robert's absence, Wm. died, and the throne was seized by Henry I. (1100). In 1101 Robert returned from crusading and invaded England, but was repulsed, and in 1106 Henry crossed over to Normandy and defeated and took prisoner Robert at the battle of Tinchebrai. During the rest of his life Robert remained the forced guest of his brother. Henry I. was the first of the Norman kings to encourage the fusion of the races, he himself married a Saxon wife, and in this way did much to ensure the popularity of his house. He ruled sternly but wisely, and the wisdom of his policy was seen in the help which he received from his Saxon subjects in putting down the revolt of the barons of the W. In 1120 his only son Wm. was drowned in the wreck of the *White Ship*, and the greater part of the rest of Henry's life was taken up in the attempt to get his daughter Maud recognised as the heir to the throne. Previous to his death in 1135, he coerced the barons into promises to recognise Maud, but they disliked the idea of being ruled by a woman, and further dreaded the power which such recognition would give to the husband of Maud, Geoffrey of Anjou. Finally, when Henry died the barons elected as king Stephen of Blois, whose only claims to the throne were that he was the grandson of Wm. I., and that he was a brave but complaisant and easily pleased warrior.

With the accession of Stephen, in 1135, Civil war broke out and continued practically during the whole of his reign. The barons were able to exercise their power unchecked and the people, crushed between the forces of the king and of Queen Maud, also found themselves oppressed even more terribly by the barons. But these events taught England definitely that the power of a strong if tyrannous king was less to be dreaded than the power of an unchecked baronage. Finally, in 1153, the treaty of Wallingford was signed by Stephen and Henry, son of Maud. By the terms of this treaty, Stephen was to reign until his death, when he was to be succeeded by Henry. Henry II. was one of the greatest kings of England. He ruled not only England, but Normandy, Maine, Anjou, Touraine, and Aquitaine. He was acknowledged overlord of Scotland, Ireland, and Wales; he practically ruled Brittany—in fact his dominions may be regarded as stretching from the Pyrenees to the Orkneys. He destroyed the power of the baronage, and

by judicious reforms he obtained the support of the people, but he failed when he attacked the church. The point at which he had been aiming, the subordination of eccles. law to the crown, failed when it had almost succeeded, by the murder of Becket in 1170. During his reign, Strongbow (Richard de Clare, earl of Pembroke, d. 1178) crossed over into Ireland and began the conquest of that country. The latter part of Henry II.'s

succeeded by John. That the succession question was still in a state of chaos is obvious from an examination of the successions during the Norman and early Angevin dynasties. In only one instance had the heir by right of primogeniture succeeded. John now succeeded to the throne which would according to modern practice have been occupied by his nephew Arthur. His succession was regarded as in no way extraordinary, and



Johannes dei Gra. Rex Angl. Dux Bryt. Dux Norm. Aquit. & Comes
 Andeg. Archiep. Eps. Abbs. Comes. Barones. Just. & ceteri. vici
 comites. Prepositi. Milites. & omnes Ballivi & ceteri. Salu.
 Nullus liber homo capiat ut imprisonet. aut dilacionem. aut vilagat.
 aut exulet. aut aliquo modo defruat. nec sup eum ibimus nec sup eum mittimus nisi p le-
 gale iudicium factum iuxta legem terre.
 Dedit manu nram in prato quod vocat Runnymede inter
 Willelmum & Henricum. Dieo decimo die Junij. Anno Regni nostri Septi-
 mo decimo

EXTRACTS FROM THE GREAT CHARTER

A translation of the Latin

John by the Grace of God, King of England, Lord of Ireland, Duke of Normandy and Aquitaine, and Earl of Anjou :

To the Archbishops, Bishops, Abbots, Earls, Barons, Justiciaries of the Forests, Sheriffs, Governors, Officers, and to all Bailiffs and other his faithful Subjects, Greeting.

No Freeman shall be taken, or imprisoned or disseiss'd, or out-law'd or banish'd or any ways destroyed, nor will we pass upon him, or commit him to prison, unless by the legal judgment of his Peers, or by the law of the Land.

Given under our hand, in the Presence of the Witnesses above-named, and many others, in the Meadow, called Runnymede, between Windesore and Stanes the 15th Day of June, in the 17th year of our Reign.

reign was darkened by quarrels with his son. His eldest son had died virtually fighting against him; Richard was a source of constant trouble, whilst John, the darling of his old age, was untrustworthy and Judas like. The last days of the king were passed in one long struggle with his arch enemy, Philip Augustus of France, and his sons, and in 1189, after being compelled to give in, he died.

He was succeeded by his son Richard, who, however, spent the greater part of his time out of England, either on crusade or in France, during which time his brother John plotted against him, attempting, finally, to keep Richard in captivity in Austria. Even when John's treachery was obvious to the king, it was forgiven. Richard died in 1199 and was

generally accepted. The disappearance of Arthur, and the generally expressed belief that he had been murdered roused hostility to the king; nor did his manner of ruling, nor yet his open immorality, tend to make him more popular. He had energy which he did not use and ability and intelligence which he misapplied. The early years of his reign were occupied in a struggle for the Fr. possessions. For a long time it had been the unhidden ambition of Philip Augustus to win back those portions of France which were still held by the Eng. He had struggled against Henry II. and Richard I., but his opportunity came when John, unpopular throughout the whole of his dominions, succeeded. In 1204 the Château-Gallard was lost, and Normandy passed

into the hands of the Fr. John by no means gave up hope, and struggled constantly against the Fr., forming league after league. He, however, soon found himself in difficulties at home. In 1205 the barons refused to fight for the recovery of Normandy; in the following year, in spite of the violent opposition of John, Stephen Langton was appointed archbishop of Canterbury. John refused to recognise him, and in 1208 England was laid under an interdict and later the king excommunicated. During this period John had alienated the sympathies of the barons and of the people. Gradually he saw himself beset on every side; France threatened the barons negotiated, the church thundered. He turned for support to the strongest power, and became the vassal of the pope. England was to be held in fee from the papacy. This was the final blow to the barons. Led by the church, they banded themselves together under Stephen Langton, and resolved to force the king to issue a charter which would safeguard their liberties. After a struggle John found that he must surrender, and at Runnymede, on June 15, 1215, he signed the Great Charter (Magna Carta), intending to keep it as little as he had kept most other oaths. The Great Charter was the work of the barons, supported by the church, and was thoroughly reactionary. But the signing of it reconciled a number of the barons, and John thereafter had more support. He attempted to punish the N. barons who had been chiefly responsible for the Charter, and they in turn invited the Dauphin Louis to England as king. War was still raging in 1216 when John died, leaving the throne to his son, Henry III., aged nine. During the early part of the reign the chief difficulty was the Civil war. Through this dangerous period Henry was guided by Wm. Marshall, earl of Pembroke. The charters were confirmed, the baronage reconciled, and Louis finally left the country (1217). From 1217-32 the land was ruled well by Wm. Marshall, and on his death by Hubert de Burgh. The Charter was constantly reissued and confirmed, and De Burgh's policy was largely that of England for the Eng. In 1232, however, began the personal rule of Henry III., a period which is noted for the domination of foreign favourites. Henry was a pious weakling, who had but little mind of his own, but who could on occasion be extremely obstinate. He was continually exacting money, and many expedients were attempted by the baronage to obtain control of the purse. The most outstanding personage of the reign was Simon de Montfort, who came to England as a favourite of the king and remained to uphold the rights and privileges of the baron. In 1248 he was appointed governor of Gascony, and shortly afterwards was deprived of this post owing to complaints by the Gascons of his severity. He remained out of England until 1253, when he returned to place himself at the head of the baronage. In 1258 the king agreed to the Provisions of Oxford, and these provisions were finally submitted to the

arbitration of St. Louis of France, who held that the king was not bound to obey them. In the same year (1264) civil war broke out between the barons, led by Simon de Montfort, and the Royalists, whose prin. leader was Prince Edward. The Royalists were defeated at the battle of Lewes, and the king and prince became prisoners. The Mise of Lewes followed, and in 1265 was held the famous parliament of Simon de Montfort, to which the Commons were summoned. Later in the year Prince Edward escaped, defeated the barons' army, now much weakened by desertion, and slew Simon de Montfort. The death of Simon, however, did not interfere with his policy, since this was carried out by Prince Edward, who, although an opponent, yet learnt much from his enemy. The remainder of the reign passed quietly, the chief power up to 1270 being in the hands of Prince Edward, who in that year departed to the E. on crusade. In 1272 Henry III. died, and although it was two years before Edward returned to this country, there was no dispute over the succession.

Edward I. was one of the greatest of our kings, and as a law-maker and organiser ranks with Henry II. and William I. (see under EDWARD I.). Part of his policy was to construct a united England and Scotland, and the Scottish war which raged practically from 1291 to 1307 was a result of this policy. He died in 1307, with the Scots in open rebellion, and just after Robert Bruce had been crowned king. Meanwhile Wales had been finally subjugated. Edward II. succeeded his father, but his rule was influenced throughout by his favourites, Gaveston and the Despensers. During his reign the lords ordainers took practically all the power from him, but again there was a reaction in his favour, and for a time he ruled with his favourites and with the support of the people. In 1314 he gathered the largest army which had ever been sent into Scotland, and attempted to relieve Stirling, then besieged by Bruce. He fought the battle of Bannockburn and met with the greatest defeat ever inflicted upon the Eng. by the Scots. In 1327 the conspiracy of the queen and her lover, Mortimer, caused him to be deposed, and in the following year he was cruelly murdered in Berkeley Castle. He was succeeded by his son Edward III., one of England's warrior kings. At the beginning of the reign the independence of Scotland was recognised, and the reins of gov. passed for a short time into the hands of the queen-mother and Mortimer. In 1330, however, Edward III. asserted his position and became sole ruler. The early part of his reign was taken up with a Scottish war, and then finally, in 1337, Edward claimed the throne of France in right of his mother. The claim was obviously but a pretence, since Edward had previously recognised the King of France and done homage to him for Guienne. It was necessary, however, to conquer France if Scotland was to be conquered, or if the woollen trade with

Flanders was to be kept. He attacked France from two points, through Guionno and from the N. In 1346 he won the battle of Crécy, and in the following year besieged and captured Calais. In 1346 Neville's Cross had been won, and the Scottish king taken prisoner. The Fr. war ceased in 1349 owing to the outbreak of the Black Death, a plague which helped very largely in the social revolution which followed. The condition of the serfs and peasantry of England was helped very largely by the devastation caused by that plague. In 1356 the Black Prince won the battle of Poitiers. This was the last great victory of Edward's reign. The rest of his life was spent in dissoluteness and under the influence of Alice Perrers, his mistress. During his reign, however, great strides were made in the constitutional gov. of the country, and the power of Parliament increased rapidly. This was due to the fact that Edward, in order to wage war, was in constant need of supplies, and was prepared to grant great privileges in order to obtain them. He died in 1377, preceded by his son the Black Prince. He was succeeded by his grandson, Richard II. Richard had ability which, however, was not always employed in the right direction. He was fearless, and to a certain extent popular, but the period of his personal rule was tyrannical, and Henry Bolingbroke, returning from exile in 1399, was easily able to depose him. He was imprisoned and finally murdered in Pontefract Castle. With him ended the Plantagenet line of kings. During his reign died Wycliffe, the great reformer, and just at the end of the reign Chaucer, the first of the great Eng. poets, also died.

Bolingbroke, who succeeded as Henry IV., was the eldest son of John of Gaunt, the third son of Edward III. He claimed the throne, not by conquest, but by parli. election, and was the founder of the House of Lancaster. He ruled wisely and prudently, and though it is true that he was never personally popular, he at least kept the country at peace. In 1403 Henry Percy, earl of Northumberland, nicknamed 'Hotspur', rebelled against him, and was supported by Owen Glyndwr, both of whom were overthrown by Henry IV. at the battle of Shrewsbury. Henry also persecuted the Lollards, a name given to those who adopted the new religious teaching of Wycliffe. After a long and painful illness he died in the year 1413. He was succeeded by his son, Henry V., concerning whom so many stories are told of the wildness of his youth. He, however, proved himself a strong and capable king, but did not live long enough to enjoy the fruits of his triumphs. He also persecuted the Lollards, and renewed the war with France. In 1415 he achieved a notable victory at Agincourt. France was at this time divided into factions, and taking advantage of this fact, by judicious alliances Henry succeeded, in 1420, in forcing the Fr. king to sign the Treaty of Troyes, which gave Henry the Fr. king's daughter's hand in marriage, the regency of the country, and the ultimate success-

sion to the throne of France. In 1422, just after the birth of his heir, he died. He was succeeded on the thrones of both France and England by his young son, Henry VI., for whom the regents, his uncles the dukes of Bedford and Gloucester administered the country. During the early part of the reign the Eng. still continued to win victories, but finally the Fr. settled their differences and after the appearance of Joan of Arc went from victory to victory, finally, in 1454, driving the Eng. out of everywhere save Calais. At home the war expenses and the constant stream of returning soldiers made social conditions bad, and this found expression in the revolt of Cade in 1450. Meanwhile, the king had suffered lapses from sanity, and the supporters of the house of York began to claim the throne, alleging, and correctly, that their candidate, Richard, duke of York, was the more direct descendant of Edward III. The argument was answerable in only one way, and that was that the Lancastrians were on the throne by right of election by Parliament. In 1455 war broke out, and lasted up to 1471. The Yorkists were at first successful at St. Albans, and the king fell a prisoner into their hands. In 1460 York was defeated and slain at Wakefield by Margaret of Anjou, but the earl of March, coming up from the W., entered London, was proclaimed king as Edward IV., and marching up N. defeated Margaret at Towton (1461).

For some time the country remained more or less at peace. Richard Neville, earl of Warwick and Salisbury, called the king-maker dictated the policy of the country. But the king flouted the great earl on two occasions and drove him into the camp of the Lancastrians. Warwick landed from France and forced Edward into exile, proclaiming Henry VI. again. Edward, however, returned unexpectedly from exile, defeated and slew Warwick at Barnet (1471), crushed the last hope of the Lancastrians at Tewkesbury three weeks later, and again established himself firmly as king. He had great statesmanship and cunning, but was a man of vicious life whose excesses finally killed him. He ruled as a despot, and may be regarded as the first of the new monarchy. The old institutions had broken down, the church was undermined by wealth and laxity in high places, the nobility weakened and impotent, the commons desirous only of a king who would keep peace and allow them to trade. The country was on the verge of a new awakening, and Edward was sagacious enough to read the time aright. He kept peace; when he did go to war he withdrew for a sufficient sum of money, and he was a patron of the new learning and of the art of printing—typically a prince of the Renaissance. He caused great jealousy by the promotion of some of his wife's relations; he died in 1483. His son, Edward V., succeeded him, only to be murdered in the Tower of London, after a two months' reign, by his uncle, Richard of Gloucester, who on the death

of the prince and his brother caused himself to be proclaimed as Richard III. He was a brave man who certainly had good ideas and ability to carry them out, but he was unpopular, and gradually the story of the murder of the princes increased this unpopularity. A conspiracy was made against him by Henry Tudor, earl of Richmond, who came over from France, met Richard at Bosworth Field (1485), and there defeated and slew him, owing principally to the wholesale desertions of Richard by the nobles. Henry was crowned on the battlefield.

Henry VII. was descended on his father's side from the Tudors, on his mother's (illegitimately) from John of Gaunt, and was therefore hailed by the Lancastrians as the representative of their line. He claimed the throne by descent and by election, and finally put an end to the rival claims by marrying Elizabeth of York, the daughter of Edward IV., thus uniting the two lines. He crushed the remaining power of the baronage, he overthrew what little power remained to the clergy, he ruled despotically, but he restored commerce and raised England again to the rank of a European power. He was miserly, but to him the possession of money meant the possession of power. The attempts of Lambert Simnel and Perkin Warbeck were defeated, and Henry's position was strengthened by the marriage of his son to Catherine of Aragon, and his daughter to James IV. of Scotland, both marriages of vital importance to England. He died in 1509, leaving Henry VIII. with a secure hold on the throne and affection of the people.

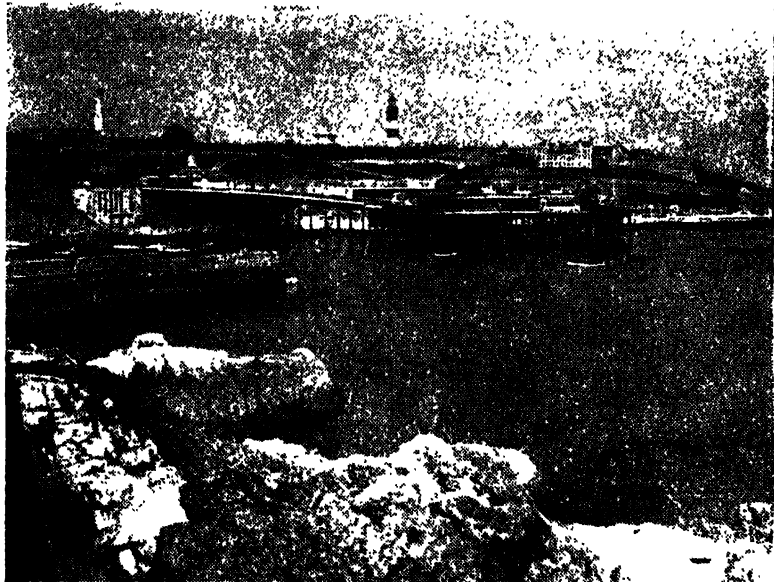
The reign of Henry is notable chiefly for the separation of the Eng. Church from Rome. At the beginning of his reign there was some slight trouble with France and Scotland, the Scottish war being ended in 1513 by the battle of Flodden. Wolsey, Henry's chief minister during the early part of his reign, remained firm to the policy of preserving the Balance of Power (*q.v.*), the Emperor Charles V. and the Fr. constantly bidding one against the other for the friendship of England. Henry's attitude towards the doctrines of the church may be judged from the fact that he pub. a book against the teachings of Luther, and received from the pope the title 'Defender of the Faith.' By 1526, however, he had grown tired of his wife, Catherine of Aragon, and posed as having religious scruples as to the validity of the marriage. He demanded, through Wolsey, a decree of nullity from the pope, Clement VII. This was refused and the fact that the troops of Charles V. (Catherine's nephew) had just captured Rome, and the pope was in their hands is believed by some historians to have determined this papal decision. Finally, the pope appointed two legates, Wolsey and Campeggio, to try the case, but Campeggio received orders that it was to be adjourned to Rome. In the meantime, Henry, who desired to marry Anne Boleyn to legitimise the child which was coming, accused Wolsey of putting unnecessary obstacles in the way. When

the trial was adjourned to Rome he disgraced Wolsey, and taking the advice of Cranmer and Thomas Cromwell, he broke away from Rome and forced the Eng. Church to obey him as its supreme head. There was no change in doctrine save in a few minor points. The Six Acts forced the doctrines of the Church of Rome even on recalcitrants who hoped to introduce the reformed doctrines current on the Continent into the Eng. Church; nevertheless Henry was now head of the church and not the pope. In order to have full control over the churches and to glut the greed of Henry and his supporters, the monasteries were dissolved. In 1536 the smaller ones went; in 1539 the larger monasteries suffered also. These changes provoked sev. abortive rebellions which were put down with great cruelty. Their lands enriched the king and the nobility. During the later years of the reign a tendency towards Protestantism became more apparent in the country. The influence of the Ger. Reformation was being felt more and more, but it is necessary to separate distinctly the so-called Eng. Reformation and the Ger. Reformation. In his old age Henry became merely a brutal tyrant; he died in 1547, having married six times. He had been given authority to settle the succession for himself. By his will he had left the throne to Edward VI., to be followed, if he died without children, by Mary, daughter of Catherine of Aragon; she in turn to be followed by Elizabeth, daughter of Anne Boleyn. Edward VI. was only nine years of age when he succeeded; the country was ruled for him by the protectors, the dukes of Somerset and Northumberland. During this reign Protestantism first gained a secure footing in the country. The churches were stripped of images, the Catholic service was stopped, and the first Eng. Prayer Book was issued. In many parts of the country this attempt to oust the Catholic religion was deeply resented, but in spite of this Protestantism spread. In 1553 Edward VI. died. He left a will which set aside that of his father, and gave the throne to the Lady Jane Grey. This plot was due to the influence of Northumberland, who knew that his power was at an end the moment that Mary succeeded to the throne. Mary, however, found no difficulty in obtaining recognition, and Northumberland, Dudley, his son, and the Lady Jane Grey were committed to the Tower, and later beheaded.

Mary had always been a fervent Catholic; she now restored the Catholic religion, and for a time England reverted to the papacy. She married Philip II., King of Spain, and this, together with the religious persecutions which took place, did much to make her unpopular. Further, the alliance with Spain involved a war with France, and during that war England lost her last Fr. possession, Calais. Amongst the 'heretics' burned during this reign were Latimer, Ridley, and Cranmer. Mary died in 1558; she was disliked by her subjects, but she was sincere in her convictions, though she was

somewhat of a fanatic. She was succeeded by her half-sister, Elizabeth, who found little difficulty in obtaining the throne and was from her accession regarded by the majority of her subjects with affection. One of the most complex figures in Eng. history, she lived in a period when one false step would have meant ruin, or at least great national danger. She was beset on every side by enemies, and was regarded even by some of her own subjects as a usurper, and yet she managed to steer the ship of state

prisoner until her execution in 1587. The following year came the great Armada, the blow Elizabeth has long expected, but which had been delayed while both sides tried what diplomacy could do. Eng. seamanship and the elements combined to wreck the hopes of Spain, first launched at Plymouth, and the shattered Armada returned home defeated. This was the crowning victory of Elizabeth's reign; no longer need she dread the power of Spain; England was at last one of the great powers.



PLYMOUTH HOE

John H. Stone

safely for forty-five years. That she was helped by circumstances there is no doubt, that her ministers were clever men cannot be denied, but much must be allowed to her own personality and genius. She tried to provide the Church of England with a 'via media,' a compromise of doctrine which should reconcile Catholic and Calvinist. The upshot was sporadic persecution of the extreme and violent among the Puritan sectaries, and a series of Penal Laws against Recusants, Jesuits and Seminary Priests. Her great danger, politically, lay in Scotland and Spain. France could, for the time being, be disregarded, since internal affairs kept her busy and desirous of peace. Scotland was disturbed by the religious quarrels, and, finally, Mary Queen of Scots, Elizabeth's greatest rival, was driven a fugitive into England, where she remained a

The most significant feature of Elizabeth's reign is that series of events which may best be described as the Eng. Renaissance. The sea rovers plundered the Sp. Main, discovered new lands, and made a name for themselves throughout the world. In every dept. of national life there were fresh developments. She died in 1603 after a reign which will always be remembered as one of the greatest in the hist. of the Eng. nation. (See ELIZABETH.) She was succeeded by James VI. of Scotland and I. of England. Thus the united Great Britain of Edward I. was accomplished through the marriage schemes of Henry VII. The early events of the reign were the attempts to reconcile Puritanism and Anglicanism, which failed, and the Gunpowder Plot of 1605. During this reign we find all the essential causes of the civil war which broke out during

the next reign: the mistaken foreign policy, the unpopularity of the king, the unjust taxation, and the desire to rule despotically, this time by divine right. The Stuarts tried to carry on the old policy of the Tudors, and to be despotic monarchs. The essential difference between these two dynasties was that whereas the Tudors were personally popular, the Stuarts were not, whereas the Tudors ruled despotically only because the people supported them, the Stuarts failed because they claimed a divine right to rule in spite of the people. It must be remembered that from this period onward towards the end of the century, Puritanism played a great part, and Puritanism meant not only a desire for liberty of worship, but also political liberty as well. It was in the struggle against Puritanism that divine right and passive obedience were overthrown.

During the reign of James, the Thirty Years' war broke out in Europe, and the king tried to act for a time as the arbiter of Europe. His schemes failed, and he died in 1625 with the reputation of being the wisest fool in Christendom. Charles I. succeeded. His reign may best be described as one long series of blunders. Parliament attacked his favourites, refused him supplies, and, finally, in 1628, forced the Petition of Right upon him. From 1629 to 1640 he ruled without a parliament. During this period occurred the famous ship-money cases, and continual breaches of the law. Finally, it was on the rock of the Church in Scotland that Charles foundered. His attempts to imitate his father and force Episcopacy on the Scots roused anger in Scotland, the introduction of the Prayer Book of Laud led to open rebellion, and the first Bishops' war broke out (see SCOTLAND). The Short Parliament (1640) was summoned and dissolved within three weeks. Then followed the Long Parliament, which undid the work of the eleven years' tyranny, but which at the same time did much that was unconstitutional. Strafford was executed; Laud met with the same fate later. Ship-money was declared illegal, the Star Chamber abolished, and finally the king was forced to consent to the reading of the Grand Remonstrance. He then made his fatal mistake: he attempted to arrest five members, and failing, left London. He went N. and tried to enter Hull, but was refused admission, and finally, on Aug. 22, 1642, he raised his standard at Nottingham. At first the Royalists were successful, but this was due chiefly to the fact that the they were more accustomed to arms than the Roundheads; but finally came the formation of the New Model Army, and the defeats at Marston Moor and Naseby. The king surrendered to the Scots, and was finally handed over to the Eng., by whom, after prolonged negotiations and the outbreak of the second Civil War, he was executed (Jan. 1649).

It is to be admitted, however, that modern historians take a rather less one-sided view of the contest between king and parliament than that which has pre-

vailed for nearly 300 years. For it will be seen from the Maseroes Papers and other reliable contemporary evidence that the king had in effect given way on all or most of the demands of parliament before the outbreak of the Civil war. Furthermore, Charles himself was really fighting the people's fight against the bigotry of the Puritans and this fact is recognised in the celebration of the day (Jan. 30) of his martyrdom.

For the next eleven years England was a commonwealth—for the first four years a republic, for the remaining seven a protectorate. The execution of the king roused horror throughout Europe; Scotland and Ireland rose in revolt, and Charles II. was crowned in Scotland, but the Scots were routed at Dunbar and Worcester, and the Irish at Wexford and Drogheda. For a short time England, Scotland, and Ireland were united. In 1653 Oliver Cromwell became Protector, and although he ruled as tyrannously as Charles I., he was an efficient tyrant, whereas Charles was not. Further, his foreign policy was spirited and popular, and placed England high in the councils of Europe. In 1658 Cromwell died, and there was chaos for a time in England. Richard Cromwell was inefficient, and finally Monk, marching from Scotland with the army, declared in favour of a free parliament which restored Charles II.

The Restoration was hailed with enthusiasm by the vast majority of the nation. The sombreness of the Puritan era had disgusted them, and was also partly responsible for the excesses of Charles II.'s reign. The Cavalier Parliament went much further than the promises of Charles in the Declaration of Breda would have led one to expect. The reign of Charles is marked by a reaction from the dreary morality of puritanism; to all intents and purposes Charles was the headman of Louis XIV. He aimed always at toleration for the Catholic religion in the interests of national unity, but the influence of the Protestant landowners and city merchants was too strong for him. It was a period of national disaster and shame; the guns of the Dutch were heard on the Thames from the City of London. In 1665 the Great Plague broke out and in the following year the Great Fire destroyed London. The Popish Plot, fabricated by Titus Oates, led to the introduction of the Exclusion Bill, and the Petitioners and Abhorers formed the nucleus of the Whigs and Tories of the following century. The country was inflamed by religious quarrels, and through it all Charles worked quietly for permanent toleration. Towards the end of his reign, when everything seemed blackest, he appealed to his people, and the latter years of his reign were years of triumph. He died in 1685, witty and cynical to the end. James, duke of York, who succeeded him, inherited far more of the attributes of his father, Charles I. His obstinacy led him into difficulties which his brother would have avoided, and his open avowal of the Catholic faith, whilst it did not at first

alienate his subjects, prepared the way for the Revolution. James openly attempted to restore freedom for the Catholic faith. Catholics were introduced into the army and the univ., the penal laws against them were dispensed with, and the king finally issued a Declaration of Indulgence (1687). Seven bishops petitioned against this, but they were imprisoned and tried for seditious libel. They were acquitted amidst the applause of the people, even the army which James had gathered at Hounslow cheering the acquittal. At the same time an heir was born to James, and this made speedy action necessary. Hitherto the next heir to the throne had been Mary, his daughter, a Protestant, and the wife of Wm. of Orange. Now it was certain that the heir would be educated in the Catholic faith. Messengers were despatched to Wm. of Orange. Wm. landed at Brixham; before the end of the year he was in London, and by that time James had fled, had been recaptured, and permitted to escape again. Wm. and Mary signed the Declaration of Right and were declared joint sovereigns, whilst Catholics or any who should marry a Catholic were barred from succession to the Eng. throne. The actual Revolution had been bloodless, though it was really the culmination of the six years Civil war which had ended in the execution of Charles I. and revolts in Scotland and Ireland. Rebellions broke out in Scotland and Ireland, but were speedily crushed. In 1692 the Massacre of Glencoe took place, and Ireland, after the treaty of Limerick, gave no more trouble until the end of the century. That the Irish had right on their side when they spoke of betrayal there can be no doubt.

England in the meantime engaged with Holland in the war of the Protestant Succession against Louis XIV., and although Wm. was not a successful general, the Treaty of Ryswick in 1697 made Louis acknowledge for the first time that he had not been altogether successful. Both sides, however, now prepared for the greater struggle which they saw must come. The question of the Sp. Succession must soon be settled, and both Wm. and Louis were interested in that settlement (see SPAIN—History). The Partition Treaties were drawn up and agreed to, but finally Louis accepted the will of the Sp. king which left Spain to the Fr. king's grandson, and England and France again prepared for war. But even now the Eng. were not prepared to go to war on the point of the Sp. Succession only when Louis made the second of his great blunders. James II. died, and he acknowledged the Old Pretender as James III. England immediately clamoured for war, and during the preparations Wm. III. died (1702). He had already been preceded by Mary, who died 1691, and since they had no children was succeeded by Anne, the second daughter of James II.

The war of the Sp. Succession broke out at the beginning of the reign. It was fought in order to preserve the Balance of Power in Europe and prevent France from

dominating the whole of the Continent. John Churchill, duke of Marlborough, the Eng. commander, won the victories of Blenheim (1701), Ramillies (1706), Malplaquet (1705), Oudenarde (1709). Gibraltar was captured by the allies and Louis was forced to acknowledge defeat, but the allies pressed terms too heavily upon him and he made another desperate effort to free himself, succeeding certainly in mitigating the terms imposed on him. Meanwhile at home the Tories had become powerful and were desirous of peace, and so in 1713 was signed the treaty of Utrecht, which gave England the beginning of her colonial empire.

In 1707 the Act of Union between England and Scotland had been passed and had come into force (see SCOTLAND—History), and towards the end of the reign the question of succession had to be settled. The last child of Anne had died in 1700, and the Act of Settlement had vested the crown in the nearest Protestant heirs of Sophia, electress of Hanover, and her descendants. But the Tory ministers, St. John and Harley, plotted the restoration of the Stuarts, and it was well known that the queen favoured the restoration of her half-brother, but the sudden death of the queen and the swift measures adopted by the Whigs prevented any serious steps from being taken, and in 1714, on the death of Anne, George I. was proclaimed without resistance. The Act of Union of 1707 had made England and Scotland one under the name of Great Britain, and from the accession of George I. the hist. of both countries is treated under the heading GREAT BRITAIN. See also BRITAIN, ANCIENT.

Bibliography—SHORT SURVEYS: J. R. Green, *A Short History of the English People*, 1871; J. A. Williamson, *The Evolution of England*, 1931; G. M. Trevelyan, *History of England to 1919*, 1937; E. L. Woodward, *History of England*, 1948; E. Halczy (trans. E. I. Watkins), *History of the English People*, 1948. CO-OPERATIVE WORKS: W. Hunt and R. L. Poole (ed.), *Longman's Political History of England*, 1907; C. Onan (ed.), *Methuen's History of England*, 1911; G. N. Clark (ed.), *The Oxford History of England*, 1931; THE CLASSIC WORKS: T. B. Macaulay, *The History of England from the Accession of James II.*, 1855; J. A. Froude, *A History of England from the Fall of Wolsey to the Defeat of the Spanish Armada*, 1870; S. R. Gardiner, *History of England from the Accession of James I. to the Outbreak of the Civil War*, 1883-4, *History of the Great Civil War*, 1886-91, and *History of the Commonwealth and Protectorate*, 1891-1901 (continued by C. H. Firth), *The Last Years of the Protectorate*, 1909; see also C. H. Firth, *A Commentary on Macaulay's History of England*, 1938; W. Stubbs, *The Constitutional History of England*, 1898. EARLY AUTHORITIES: Bede, *Ecclesiastical History of the English Nation*, c. 1475; Holmsted's *Chronicle*, 1578 (Dent); *The Anglo-Saxon Chronicle*, 1644; Earl of Charendon, *History of the Rebellion*, 1702; Jean Froissart, *Chronicles*, T. Johnes's

trans., 1844; *The Patson Letters*; G. Burnet, *History of My Own Times*, 1723. **POLITICAL HISTORY (MONOGRAPHS):** J. M. Kemble, *The Saxons in England* (2 vols.), 1849; J. Ramsay, *Lancaster and York*, 1892; G. M. Trevelyan, *England in the Age of Wycliffe*, 1909; J. H. Wylie and W. T. Waugh, *The Reign of Henry V.*, 1914-29; W. S. Davis, *Life on a Medieval Barony*, 1923; K. Felling, *History of the Tory Party, 1640-1714*, 1924; J. J. Haverfield, *The Roman Occupation of Britain*, 1924; F. M. Stenton, *William the Conqueror*, 1925; C. Bémont, *Simon de Montfort*, 1208-65, 1930; G. M. Trevelyan, *England under Queen Anne*, 1931-34; Winston S. Churchill, *Marlborough, his Life and Times*, 1933-38; D. Ogg, *England in the Reign of Charles II.*, 1934; T. F. Tout, *The Place of the Reign of Edward II. in English History*, 1936; J. E. A. Jolliffe, *Constitutional History of Medieval England*, 1937; R. H. Hodgkin, *A History of the Anglo-Saxons*, 1940; Edith Richert (ed. by Clair C. Olson and M. M. Crow) *Chaucer's World*, 1948; T. Mathew, *The Social Structure of Caroline England*, 1948.

English Horn, see COR ANGLAIS.

English Language, member of the W. Germanic branch of the Teutonic or Germanic div. of the great Aryan or Indo-European family of languages, to which family belong also the classical and romance tongues. The Germanic group divides into three smaller groups: the E. Germanic, of which the Gothic is the only literary representative; the N. Germanic, to which belong the Swedish, Norse, and Icelandic; the W. Germanic, to which belong High Ger., Old Saxon, Frisian, and all the dialects of O.E. There were originally no great differences of vocabulary and syntax between these groups.

The original inhabs. of England were Celts, but after the conquest of the land by the Romans, the process of Latinising them probably went on in England just as in France or Spain. After the departure of the Romans, the Picts and Scots so harassed the helpless Britons that they are traditionally credited with having called in the aid of heathen tribes from the other side of the N. Sea (see also under ENGLAND). Bede tells us that they were 'de tribus Germaniæ populis fortioribus,' and he gives us to understand the Anglians settled to the N. of the Humber, the Saxons around the Thames, and the Jutes in the Isle of Wight and the land opposite to it. The accuracy of this statement has been much questioned on account of certain difficulties it presents, but it is now recognised as generally correct, and it will be seen later that the test of language supports it.

On the analogy of the Ger. language, the development of Eng. is divided into three periods. *Old English* (O.E.) from the beginnings, usually placed at the year A.D. 700, until 1200. A subdivision is made about 900, all before that being called Early O.E., all after, Late O.E. *Middle English* dates from 1200 to 1500, and *New or Modern English* from 1500 to the present day. O.E. is also known as

A.-S., but it is important to notice that its writers themselves claimed to be writing 'Englisc,' and that since the hist. of the language is perfectly continuous there is little reason to give its early phases an entirely different name from the later ones. There is, of course, no clear div. between O.E. and Middle Eng., or between Middle Eng. and New Eng. The transition is gradual, and the characteristics of the later form may be found in works earlier than the date of div. Yet, though the development is perfectly continuous, it has been so great that the 'Englisc' of Alfred would be perfectly unintelligible to a man of the present day.

1. *Old English* is divided into four dialects: (1) *Northumbrian* and (2) *Mercian*, which are grouped together under the name *Anglian*; (3) *West Saxon*, and (4) *Kentish*. Northumbrian was spoken roughly from the Humber to the Lowlands of Scotland; Mercian from the Humber southward to Essex and the Thames. W. Saxon from Kent westward. The two Anglian dialects were very similar, and the remains of them which have survived are not sufficient to allow us to differentiate between them. The most valuable remains of the Kentish dialect are some charters made for the disposal of property, and since charters are things which no one would copy, it is certain that we possess them in the original form, showing the exact dialect of the dist. where the charter was made. The first dialect to rise into literary prominence was the Northumbrian, and during the Early O.E. period the Northumbrian schools were some of the most learned in Christendom. From them came the learned Alcuin (A.D. 735), confidant and adviser of Charlemagne. There is no reason to doubt that much work was produced in the vernacular both in poetry and in prose. But all, with the exception of a few fragments, such as a riddle, Bede's death-song, some glosses, and the beginning of Caedmon's Hymn, preserved in Bede's *Ecclesiastical History* (c. 1475), have perished. The invasions of the Danes during the eighth and ninth centuries swept away the Northumbrian literature, together with all other monuments of the culture which had been raised. As the N. literature fell, a new one arose in the S. under the guidance of Alfred, and a large number of the works produced in the period which followed are extant in transcripts. Thus, almost our whole knowledge of O.E. rests upon W. Saxon, and this dialect is regarded as the norm, and all the others as variations from it.

O.E. was a synthetic language, that is to say, it expressed variations by inflection rather than by prepositions or auxiliaries. Nouns had four cases, nominative, accusative, genitive, and dative, but nominative and accusative frequently coincided. There were two declensions, the strong and the weak. Much levelling had gone on among the declensions of the strong nouns, so that the separate five strong declensions are hardly distinguishable. The masculine word *dōm* (judgment) will show the typical form: *Sing.*,

nom. and acc. *dōm*, gen. *dōmes*, dat. *dōme*; *plur.*, nom. and acc. *domas*, gen. *domā*, dat. *dōmum*; neuters of this declension with a short stem vowel add *u* in the nom. and acc. plural. The strong feminine ends in a consonant or *u*, and is declined thus: *Sing.*, nom. and acc. *giefu* (gift), gen. and dat. *giefe*; *Plur.*, nom. *giefa*, acc. *giefe*, gen. *giefena* or *giefa*, dat. *giefum*. The weak declension nouns make their oblique cases in the singular with *n*, and in the plural thus (of the noun *nama*, a name), nom. and acc. *naman*, gen. *namena*, dat. *namum*. A certain number of nouns, such as *bōc*, *fader*, *mann*, are declined in special ways, and are generally grouped together under one head as consonant stems. The grammatical gender of O.E. is not necessarily connected with the natural gender. Thus, as we have seen, the noun *dōm* is masc. and *giefu* is fem., similarly we have *dag* (day), masc., and *ār* (honour) fem. As in Modern Ger., the word for child (*cild*) was neuter, as also was *wif*, the word for woman. Adjectives were inflected according to both strong and weak declensions, and had also separate forms for each of the genders. The weak form was used in particular positions, of which the most common is after the definite article. If the noun had the article therefore, the adjective was weak; if it had not, the adjective was strong. The definite article had also its three genders, masc. *se*, fem. *seo*, neut. *pæt*; it was used as a demonstrative as well as an article. The verbs, as in Modern Eng., were both strong and weak, and broadly speaking, there have since been few changes of verbs from one class to the other. The strong verbs made their past tense by an internal vowel change, and their past participle by the addition of *-en* and, except in one conjugation, by a vowel change. The vowel in the preterite plural and second sing. differed from that in the rest of the singular. The parts of an O.E. verb given in paradigms are thus the infinitive, the first person singular of the preterite, the first person plural preterite, and the past participle. The following paradigms of a few verbs show the method of variation: *drīan* (to drive), *drāf*, *drifon*, *drifen*; *bidian* (to pray), *bæd*, *bædon*, *boden*; *ceosan* (to choose), *ceas*, *curon*, *coren*. Weak verbs did not vary the preterite vowel, and so the plural preterite is not given. They formed their preterite and past participle either in *-ode* and *-od*, or *-de* and *-ed*. Thus, we have *lufian* (to love), *lufode*, *getufod*; *hieran* (to hear or obey), *hieric*, *gehiered*. Some few weak verbs have also a change of vowel, thus, *pencan* (to think), *pohte*, *gepoht*. The O.E. verb had only two proper tenses, the present and the preterite, the former of these being normally used to express future as well as present time. The use of the auxiliaries (*wile*, *hæfde*, etc.) is early seen, though it does not become common until towards the end of the O.E. period. The order of words is less fixed than in Modern Eng., on account of the abundance of inflections. The general order closely resembles that of Modern Ger., which has kept the old Teutonic grammar almost

intact. Not only was the grammar and syntax of O.E. purely Teutonic, but its vocabulary also was practically pure. Cognates, with most of the words found in our old texts, are also found in Gothic, Old Norse, Icelandic, Old High Ger., Old Saxon, etc., and the development of the science of philology in recent years has made the relations between them comparatively clear. The regularity of these relations was broken only when Eng. started the introduction of a foreign vocabulary. A certain number of words borrowed from Lat. are found in O.E. documents. As would be expected, these occur mostly in relation to ecclesiastical services, ornaments, and practices for which no Germanic word would exist. A few others were brought over by the Saxons from the Continent, having been borrowed in earlier intercourse with the Romans. Such a word is *stræt* (street).

A word must be said as to the spelling and pronunciation of the early Eng. and their scribers. There are no traces whatever of an original Germanic alphabet, for it is now quite clear that the Runic alphabet, or 'futhorc', was derived at a date before the fifth century B.C. from the alphabet in use among the Gks. This alphabet was used at an early date in England for inscriptions on (Runic) crosses, etc., but there is no sign of any written Runic literature. The introduction of the Lat. alphabet came with the Christianising of the country, being brought in slightly differing forms by the missionaries both from Ireland and from Rome. The Celtic form was generally adopted, with certain modifications, from the Runic alphabet. From this the sign *þ* was taken to signify the unvoiced *th* as in 'thin,' and the sign *ƿ* replaced the Lat. *u* (*v*). In order to denote the voiced *th* as in 'there,' a crossed *d* was used in the form *ð*. This character is known as 'thorn.' These two signs came to be confused at an early date, and there is no clear distinction between them in existing MSS. But their origin shows the attempt naturally made to render the spelling phonetic, and this attempt was kept up with a greater or less degree of success until the invention of printing caused the gradual fixing of the spelling. During the O.E. period, however, we may regard the spelling as quite phonetic, except for a few defects, one of which, the lack of distinction between hard and soft *th*, has been already mentioned. Moreover, *f* had to do duty for both the voiced and the unvoiced sounds, being pronounced unvoiced except between two vowels. The letter *y* had the sound of Ger. *ü*, while initial *c* was probably pronounced *ch*. The letter *g* was often soft when it commenced a word and in certain other cases, so often has *f* substituted for it. Thus *lung* and *geong* are both forms of the word for young. The combination *cg* as in *hrycg* (back) is pronounced as *gg*. Medial *h* was a guttural sound, similar to the Modern Scot. *ch* in *loch*. Double consonants were not slurred as in N.E., but each was given its full value.

2. *Middle English*.—Though it is true

that the Norman Conquest accelerated the decay of the O.E. grammar and syntax, yet it was not the cause of this decay. The action had set in a good many years before, and for a long while the Fr. court had very little influence on the native language. Layamon's *Brut* shows surprisingly few borrowings from Norman Fr., and this is indicative of the general state of affairs. The loss of its synthetic character left the language in a very poor state, for the rigid order of an analytic language had not yet been made, and frequent ambiguity results. The best monument of this transition period which may be consulted is the last entry, that for the reign of Stephen, in the Old English Chronicle. In the Middle Eng. period the dialects are found somewhat differently distributed, and so receive different names. (1) The *Northern* corresponds roughly to the old Northumbrian, and still includes Lowland Scot., of which language in its modern form it is the ancestor. (2) The *Midland*, roughly equivalent to the Old Mercian, is divided again into E. and W. Midland, sometimes with further subdivisions into N. and S.E. Midland, N. and S.W. Midland. (3) *Southern*, the descendant of the old W. Saxon, with an admixture of Mercian. The dialects of the W. country, as shown, for example, in W. Barnes's *Dorsetshire Farmer* show this dialect at a later stage. (4) *Kentish*, which, from its proximity to London, and the fact that both Chaucer and Caxton were Kentish men, has had a considerable influence on the development of the language.

But this div., though it is probably agreeable to the facts in a general way, does not carry us very far when we come to an examination of Middle Eng. MSS. Nor is it quite so complete and satisfactory a div. as was the O.E. one. In O.E. there was a standard literary W. Saxon dialect, and the MSS. which we possess show agreement in their spelling system and the pronunciation which lies behind it. This is not so in Middle Eng. Almost every vii may be said to have developed its own dialect as the old forms died out, and the survival of a literary language was impossible during the period of Fr. dominance. Another difficulty then arose for the scribes. They were most of them educated in the writings of the centuries past, and here they found a system of spelling which did not adequately represent the changed sounds of the new generations. Many of them, by copying the old texts, introduced an arbitrary spelling into Eng. Hence dates the commencement of the decay of the old phonetic spelling. This will, perhaps, be the best place to speak of a curious spelling experiment which was made by a N. writer of the name of Orm or Ormin. He wrought a lengthy metrical version of the Gospel known as the *Ormulum*, in which he employed an elaborate metrical system, the exact meaning of which has yet to be discovered. It relies largely on the doubling of consonants, but there are also other devices, such as two or three strokes over a letter. Orm was very proud of his spelling and charged all his

scribes to retain his forms intact; but there is no trace of any other writer having adopted his scheme. It is in this period that we again find the work of the N. prominent. The anct. culture had been swept away by the Danes, but these vandals, after having visited the shores of the Eng. coast as pirates, ultimately settled in the land and became peaceful settlers. In the time of Alfred, as is well known, the N.E. half of the country was Dan., and our annals also register a Dan. dynasty. Now the Dan. (or Scandinavian) was a language closely related to the Anglian dialects, differing from them chiefly in its inflections. The result of intercourse between Anglians and Danes is, therefore, easy to see. The stems of the words became important, the inflections were useless, and hence the process of getting rid of them went on fastest in the North, where Fr. influence was least strong. Hence the early Middle Eng. pieces in N. dialect, such as the *Cursor Mundi*, are characterised by a surprising modernity, for not only have the inflections almost all disappeared, but the syntax shows many features characteristic of that of the present day. A northern M.S. of the beginning of the thirteenth century would be easier than Chaucer for a modern reader to understand. The S. dialect is the least advanced of the three, and hence the most difficult to read. The Midland dialect is the ancestor of Modern Eng. This is accounted for by its position, in one or two ways. As lying intermediately between the N. and S. dialects it was the means of communication between them, for they were mutually unintelligible. But both Northerners and Southerners would probably have some acquaintance with Midland. Secondly, it is important to note that both the univs. of Oxford and Cambridge lay within the Midland area. Most important of all was the fact that it contained London, already the great metropolis of the kingdom. Here, too, the Midland dialect was found in its least singular forms, for intercourse between people speaking all kinds of dialects led to much levelling. It is this London dialect that forms the source of Chaucer's 'Eng. undelid.' But though the basis was thus Midland, many words, spellings, and pronunciations were borrowed from the other dialects. The most important borrowings were made from Scandinavian through the N. We have already mentioned something of the influence of the Dan. invasions on the N. dialect in hastening its inflectional disintegration. The influence is also seen in vocabulary. Many of the commonest and most useful Eng. words were borrowed at this period. Among pronouns, both *she* and *they* are Scandinavian, the original Eng. forms being *heo* and *hi* . In the S. these forms survive almost to the end of the Middle Eng. period. *Egg* is another example of borrowing, for the Eng. form, frequent in Middle Eng. is *ici*. There is much difficulty in discovering the exact dialect in which a Middle Eng. text was written. The chief cause of this is, of course, the frequent copying of MSS. The scribe copied them or

wrote them from dictation in the dialect to which he was himself accustomed, and if this dialect was different from that of the original M.S., confusion resulted. Since this process of copying occurred not once but many times in the case of popular poems, such as the *Harleik*, the rime is the best test in the case of poetry, but even this is rendered uncertain by the fact that the poet himself might well have used a form from another dialect with which he was acquainted in order to procure a rime.

We have said that the influence of the Norman Conquest on vocabulary worked but slowly. Its influence on the spelling, however, very soon took effect, as all writing soon fell into the hands either of the Normans or of those trained by them. It will be as well to mention one or two of the changes thus brought about: (1) *ou* was written for O.E. *ū*, as, for example, in mouse for O.E. *mūs*, house for O.E. *hūs*; (2) *qu* replaced O.E. *cw*, e.g. *queen* for *cūen*; (3) in many words where confusion was likely to occur in writing on account of the number of down strokes, *o* replaced *u*, e.g. *comen* for O.E. *cuman*; (4) *u* and *th* replaced *þ* and *þ*; *k* also became more common; (5) O.E. *y* was written *u*, e.g. *synne* for *synne*. This becomes a characteristic feature of the S. dialect. In inflection the chief change from O.E. to Middle Eng. is in the direction of simplification. All the O.E. diphthongs disappeared, and all vowels in unaccented syllables tended to level as *e*. *M* in inflectional syllables also became *n*. Thus *an*, *on*, and *un* all appear as *en*. There was also a regular series of vowel changes and lengthenings. Only one or two can be mentioned here. O.E. long *ā* became *ā*, pronounced as the *au* in *ought*. Thus *stān* became *stōn*. In the N. dialect alone does the original *a* remain, and its pronunciation of *stone* as *stane*, etc., is still one of its characteristics. In all but the S., O.E. *ī* (= Ger. *i*) coalesced with original *i*. New diphthongs were formed by the union of vowels with the guttural *ɣ* (*g*) or *h*. Thus O.E. *dæg* becomes *dai* or *day*, but plural *daȝes* generally appears as *daȝes*. O.E. *weg* becomes *wei* (= way), *fægn* becomes *fain* and so on. Initial *g*, probably soft even in O.E., became *y*, as in *yard*, *young*, *youth*, from O.E. *geard*, *gearn*, *gionud*. Initial *h* followed by another consonant was generally dropped, as in *ring*, *lawerl* (lord), from *hring* and *hlaforð*. In the combination *hie*, however, metathesis takes place, though the original pronunciation generally remains. The verbs simplified considerably, and in Middle Eng. the pres. plur. indicative ending forms a useful dialect test. Here the South had the old *-ap*, Midland has *-en* and North *-es* or no inflection at all. Cases almost entirely disappear, the genitive singular being the only one which retains its original inflection. The word order gradually becomes fixed as this process goes on.

3. *New English*.—About a hundred years after the London dialect had first been raised to literary eminence by the poet Chaucer, its orthography was finally cast into a mould by Caxton, who in 1477 introduced printing into England. Some

trimming would be needed in the century and a half that was to follow, but in no material point does the grammar of Caxton differ from that of twentieth century Eng., and his spelling is still easily intelligible. The following are the most important of the few grammatical differences: (1) The use of the plural *-eth*; (2) the infinitive ending *-en*, also found sometimes in the plural; (3) occasional retention of imperative plural in *-eth*; (4) genitive singular in *-es* and *-is*. Spelling was very variable, but the period of regulating thus soon follows, and once again we find the general phonetic principle, though with the revival of learning many men, but slenderly equipped for the task, attempted to re-spell old words not according to the pronunciation, but according to their real or supposed etymology. *Subtle* had the *b* inserted on account of its derivation from Latin *subtilis*. The *b*, however, had never been pronounced since the derivation was through the Fr. *subtl*. An example of mistaken etymology is seen in the word *rime* (from O.E. *rim*), which was misspelt *rhyme* on account of its supposed connection with Gk. *ῥυθμος*, with which is connected the word *rhythm*. But the earlier principle was phonetic, and it was carried out with fair consistency. Thus the spellings *ea* and *ee* denoted different sounds, *ea* as in *sea* represented the open *e* sound (pronounced somewhat as *a* in *mate*), while *ee* denoted the closed *e*. The difference is still shown by an Irishman. The open *o* (*au* in *ought*) was frequently written *oa*, and in one word, *broad*, the Elizabethan pronunciation is retained. An *e* as in *stone* was added to denote a long vowel, while the doubling of a consonant, e.g. *penny*, showed a preceding short vowel. Thus a standard orthography was attained, and it has never since been revised. Thus the first folio ed. of Shakespeare's works (1623) can be read quite easily by one almost destitute of training. But we should comprehend little if their author were to read them to us, for the pronunciation has undergone a series of gradual changes which in sum amounts to a revolution. This revolution has resulted in our vowel system being a European curiosity, while in Shakespearean times it was in accord with that of the Continent. Thus *ā* was pronounced as in *father* and except at court, where it had its present sound, the *ā* was pronounced as in Ger. Long *e*, usually written *ea*, *ee*, or *ie*, was pronounced as *a* in *mate*. In some cases, such as *head* and *feather*, shortening has since taken place. There has been no considerable change in *e*. Long *i* was then pronounced as *ee* in *meet*, but has since diphthongised into *ai*, but *i* has remained constant, as has also *o*. Long *o*, as we have seen, was pronounced as in *broad*, and this sound later became represented by *au* or *aw* as in *saw*. Short *a* was pronounced as in New Eng. *put*. Long *ū* was pronounced in the Continental manner, and has since diphthongised into *yu*. Gutturals still proved a fertile source of diversity in pronunciation and spelling, and hence the famous diversity

in Modern Eng. between the various pronunciations of *-ough*. In the eighteenth-century drama we frequently find *through* pronounced *thru*, and dialectical *enew* may still be heard for enough. Generally speaking, it may be said that the guttural either disappeared or turned into *f*. This shows briefly the chief changes in the vowel system of New Eng., though it is impossible to show here the steps by which it took place. It is not by any means to be supposed that there was any sudden and conscious change. The greatest point, however, in which the Eng. of our own century differs from that of Caxton is in its vocabulary. Middle Eng. was still comparatively a pure language, but since the invention of printing there has been a steady influx of words borrowed from all parts of the globe. Borrowings from Latin had been made even before the arrival of the Eng. in the land. Fr. borrowings were frequent during the Middle Eng. period, as were also incorporations from the kindred Scandinavian tongue. The Renaissance saw an immense number of borrowings from Gk., and more especially Lat., and vast numbers of these were never incorporated into the language. Many, indeed, of the Elizabethans definitely aimed at the Latinising of their vocabulary. Fr. again gave us many words during the Restoration period, and here again a perusal of such writers as Dryden will show us that only a proportion of the borrowings became naturalised. At other times we have borrowed from Dutch, It., Portuguese, Turkish, Chinese, and in fact from almost every language with which we have come in contact. In general, it will be found that the borrowings from these languages can be classified under regular heads. Thus Gk., from its clearness and accuracy of thought, has been called on to supply mathematical and scientific terms. The Dutch, whom we have met principally at sea, supply nautical terms and one or two for painting. Similarly Italy supplies musical terms. It will generally be found that our borrowings from Asiatic languages were for the naming of articles for which we had no Eng. equivalent, such as junk, bungalow, etc. The extent of our borrowings from the classical languages has given the Eng. language a large number of doublets and these, assuming slightly different meanings, add greatly to the richness of the language, so much so, indeed, that its varying shades and tones can be adequately expressed in no other language.

Eng. is spoken as mother-tongue by about 200 million people in the Commonwealth and the U.S.A., and as a second language by at least as many, especially in the E. (India, China, Japan). Outside England the sounds and vocabulary are more or less altered especially in Scotland, Ireland, U.S.A.; and in China (Pidgin Eng.). Deriving as it does from many tongues, it is the most international language and in a selected vocabulary such as offered in Basic English (q.v.) its use may spread even further as an auxiliary language. See also SAXON LANGUAGE AND LITERATURE; AMERICANISM.

Bibliography. GENERAL WORKS: H. Sweet, *A New English Grammar, Logical and Historical*, 1892-99; H. O. Wyld, *A Short History of English*, 1913, 1927; J. E. Wells, *A Manual of the Writings in Middle English, 1050-1400*, 1918 (six supplements, 1919-35); P. G. Thomas, *An Introduction to the History of the English Language*, 1920; A. G. Kennedy, *A Bibliography of Writings on the English Language*, 1927; A. C. Baugh, *History of the English Language*, 1935. DICTIONARIES: *A New English Dictionary on Historical Principles*, ed. by Sir J. A. H. Murray, H. Bradley, Sir W. A. Craigie, C. T. Onions, 1881-1928, revised 1933 (see DICTIONARIES); A. L. Mayhew and W. W. Skeat, *A Concise Middle-English Dictionary*, 1888; H. Sweet, *A Student's Dictionary of Anglo-Saxon*, 1895; C. T. Onions, *A Shakespeare Glossary*, 1911; W. Little, H. W. Fowler, and J. Coulson, *The Shorter Oxford Dictionary*, 1933; F. Holthausen, *Altenglisches etymologisches Wörterbuch*, 1934. SYNTAX: E. Eikenkel, *Streichzüge durch die mittelhochdeutsche Syntax*, 1887; L. Kellner, *Historical Outlines of English Syntax*, 1892; C. A. Smith, *The Order of Words in Anglo-Saxon*, 1893; F. A. Chase, *A Bibliographical Guide to Old English Syntax*, 1896; H. Shearlin, *The Expression of Purpose in Old English Prose*, 1903; J. S. Kenyon, *Syntax of the Infinitive in Chaucer*, 1909; O. Jespersen, *A Modern English Grammar on Historical Principles*, 1909-31; G. W. Small, *The Comparison of Inequality*, 1924; E. A. Krusina, *A Handbook of Present-Day English*, 1931-2. VOCABULARY, WORD-FORMATION, ETC.: W. W. Skeat, *Principles of English Etymology*, 1887, 1892; T. P. Harrison, *The Separable Prefices in Anglo-Saxon*, 1892; H. S. MacGillivray, *The Influence of Christianity on the Vocabulary of Old English*, 1902; J. C. Mendenhall, *Aureate Terms; a Study in the Literary Diction of the Fifteenth Century*, 1917; P. Logan Smith, *Words and Idioms in the English Language*, 1925; E. Weekley, *Words. Ancient and Modern*, 1926-7; B. A. Groom, *A Short History of English Words*, 1934; M. S. Serjeantson, *A History of Foreign Words in English*, 1935. OLD ENGLISH PHONOLOGY AND GRAMMAR: E. Sievers, *An Old English Grammar* (trans. by A. S. Cook), 1885, 1903; E. E. Wardale, *An Old English Grammar*, 1922, 1926. MIDDLE ENGLISH PHONOLOGY AND GRAMMAR: L. Morsback, *Mittelenglische Grammatik*, 1896; J. and E. M. Wright, *An Elementary Middle English Grammar*, 1923, 1928. MODERN ENGLISH PHONOLOGY: E. Rudolf, *Die englische Orthographie von Caxton bis Shakespeare*, 1904; H. O. Wyld, *History of Modern Colloquial English*, 1920; J. and E. M. Wright, *Elementary Historical New English Grammar*, 1924.

Such great progress has been made in the study of philology during the past century that all books pub. on the subject before the middle of the nineteenth century are almost valueless.

English Literature has its roots in the heroic poems of those teuton invaders who came to Britain after the withdrawal

of the Rom. legions early in the fifth century. This article discusses in a general way the development of poetry and prose in what we call the Brit. Isles. It takes no account of recent trends in the English-speaking world abroad, and some matters will be found treated in greater detail under their proper headings.

(1) *Old English*.—The vicissitudes of fifteen centuries have spared only fragments of O.E. literature. The earliest poetry derived its themes from the exploits of legendary germanic heroes, and the writer was bound by set forms of diction and a long alliterative line. *Widsith* or 'The Traveller,' and verses on the battles of Brunanburh and Maldon are worthy of notice; but the most famous poem of this age is the epic of *Beowulf*. It originated in pre-Christian times and, after passing through several redactions, received its present form in the seventh century.

The conversion of England gave a new direction to letters especially under the influence of the two great native scholars Aldhelm (840?–709) and Bede (673–735), both of whom are known to us only through their Lat. works. The material and thought is now largely religious and derived from Lat. sources. There is a dearth of poetic genius except in the Northumbrian school of the eighth century. Of this school the two names most celebrated are those of Caedmon and Cynewulf, and to the latter is attributed the beautiful *Dream of the Rood*. It is, however, remarkable that despite the Lat. air which literature now breathed, expression and versification, imagery and diction all remained characteristically Eng. in the old tradition. Perhaps the most original works of this period and those which mark a definite advance are such dramatic monologues as *The Wanderer*, *The Seafarer*, and *Kadwacer*. Here there first appear a lyric quality, a strophic structure, and some variation of the monotony of the long line. The beginnings of Eng. prose are associated with the name of King Alfred (871–900). Apart, however, from the *Anglo-Saxon Chronicle* most of the prose works of Alfred and his successors were for a long time trans. from the Lat. of religious writings.

(2) *Middle English*.—The Norman Conquest was no less decisive in the literary than in the political field. Not only did it expose England to continental influences, but if Lat. was the medium of gov. and scholarship, Fr. now became the exclusive language of educated people. Two examples may be cited from the transition period: the *Poema Morale*, written in the S.W. between 1100 and 1200, and the *Ormulum*. Meanwhile in the N. the old diction and metre lingered in such works as *Havelock the Dane* and *Cursor Mundi*. Many lyrics and ballads also originated at this time, which did not receive their final form until the fourteenth century and later.

From 1200 onwards poetry shows little continuity with O.E. The old diction has vanished, and rhyme has superseded alliteration. *The Owl and the Nightingale*

is considered by some to be the best of the early Middle Eng. poems; and while many Lives of the Saints were produced still more was done in the trans. of such Fr. metrical romances as the *Seven Sages*, *William and the Werewolf*, and *Sir Tristrem*. Among prose works the *Ancren Riwle*, a guide to the religious life, shows true literary genius; and the early fourteenth century mystical writings of Richard Rolle and his school had a strong influence on the development of prose style. Speaking generally, we may say that from the twelfth to the middle of the fourteenth century religion was the most fertile source of inspiration in letters as in art, and that the culture enshrined in the works of that period is Fr. rather than Eng.

In the middle of the fourteenth century the disaster of the Black Death had a profound effect upon the minds of men and consequently upon manners, art, and literature. First among the poets of this new unsettled age we must name William Langland, the reputed author of *The Vision of William concerning Piers the Plowman*. Except for a few half-jocular allusions in the poem itself, nothing is known about the author, even his surname being uncertain. The poem itself shows traces of several recensions, probably by different hands. It is a long and confused allegory, dealing with man's quest for truth, and it has a current of satire directed against all classes of the community, not least against the poor, whose cause it champions. Though written but few years before Chaucer's great works it has a much more archaic tone, emphasised by the loose alliterative verse. The work has much intrinsic merit which, together with a certain mystic beauty, offsets the difficulties presented to the modern reader by this archaism and unfamiliar versification. John Gower (c. 1325–1408), the 'moral Gower,' as Chaucer calls him, was a slightly earlier contemporary of the father of Eng. poetry. His work represents Fr. culture in a high degree. It is surpassed only by that of Chaucer whose genius has in some measure eclipsed that of his contemporary. He makes almost exclusive use of the Fr. octosyllabic verse, and his trilingualism is characteristic of the period. *Confessio Amantis*, in Eng., is a series of tales after the manner of Boccaccio illustrative of the seven deadly sins; *Vox Amantis* in Lat.; and *Speculum Mediantis* in Fr.

In Geoffrey Chaucer (1340–1400) the later Middle Ages found their fullest expression. The *Canterbury Tales* reflect every aspect of Eng. life. Chaucer began to write under Fr. influence, and he shared the Fr. inability to work out a plot. His *Parlement of Foules* belongs to the school of the *Roman de la Rose*. But two visits to Italy introduced him to Boccaccio and the Ita., and it was from the *Decamerone* of this writer that he specially profited. The Ita. had kept in closer touch with the old Lat. poets, and had retained the Virgilian art of keeping control of a story. Written under this new *Troilus* and

Cressid was influence. But Chaucer never freed himself from his early Fr. influence and to the end the enchanted garden of the Rose had its charm for him. Embarking, however, in his unique understanding of Eng. life upon the two-fold stream of Fr. and It. tradition, he achieved his masterpiece, *The Canterbury Tales*. So natural and abundant is the humour in these, so good the connection, and so well sustained the interest, that it is generally held that Chaucer as a novelist would have been the equal of Fielding. Not the least, perhaps, among Chaucer's services to Eng. poetry was his rediscovery of the decasyllabic line. He gave it a new suppleness and made it the most popular of Eng. measures. It is usual to divide the followers of Chaucer into two schools, the Scottish and the English; Scottish poetry was at first indistinguishable from N. Eng. The same dialect was spoken from the Humber to the frith of Forth, the ancestor of Lowland Scots. The Scots themselves spoke of it as 'Englis.' Almost contemporary with Chaucer was John Barbour, archdeacon of Aberdeen (1316?-95?), whom patriotic ardour stirred up to write the adventures of the Bruce, in a book bearing that title, and from him the beginning of Scottish poetry is dated. The influence of Chaucer upon the poets of the following century in the N. kingdom was most beneficial. Their poetry is vigorous and is marked by a keen appreciation of nature. This influence begins to be felt after Robert Henryson (c. 1430-c. 1506) in the work of Wm. Dunbar (1460?-1520?) whom Sir Walter Scott described as the greatest of Scottish poets. Gawain Douglas, bishop of Dunkeld (c. 1474-1542), also owed much to the southerner. He is noted as being the first to use blank verse in Eng. poetry. He used it in the translation of certain books of the *Æneid*, to which his own poetic genius contributed beautiful prologues. King James I. (1394-1437) must be classed with these poets, though almost all his literary work dates from the period of his long captivity in England. *The Kingis Quair* tells the story of his love for Jane Beaufort, whom he afterwards married. It shows the 'aureate language' which was to be characteristic of the later Chaucerians. In England, however, the disciples of Chaucer, in spite of their obvious and frequently expressed devotion for it, did little credit to their master's name. This was partly due to changes in the language. Among other things, the final *e* had now become silent, and they were thus unable to understand Chaucer's versification. They could find no regularity in it, and so themselves aimed at none. Their verse can only be described as sprawling. The two leading names are those of John Lydgate and Thomas Orlowe (both c. 1370-1450). Lydgate, a monk of Bury St. Edmunds, was a prolific author. His prin. works are: (1) the *Troy Book*, which tells the old story from Dictys Cretensis and Dares Phrygius; (2) the *Story of Thebes*, which, in a happily-written prologue, he joins on as one of the *Canterbury Tales*; (3) the *Falls of Princes*, a long

work, the plan of which is the *Monk's Tale*. It is a long catalogue of the accidents of illustrious men, taken from a Fr. version of Boccaccio's *De Casibus Illustrium Virorum*. Orlowe's chief work was a poem on the duties of kings, *De Regimine Principum*, which he presented to Henry V. Stephen Hawes (d. c. 1525) is often called the last of the Chaucerians. He was a scholar, and was familiar with Fr. and It. poetry. Somewhat more important, however, is Alexander Barclay (d. 1552), who pub. an extremely lively trans. of a Dutch satire, *The Shippe of Fools*. With John Skelton (d. 1520) we find poetry in decline, having degenerated into a ragged doggerel. Most noteworthy of the prose writings of this period were Chaucer's trans. and prose tales. John Wycliffe (d. 1384) and his followers made trans. of the Bible and wrote pamphlets in support of their teachings. The historian John Trevisa (1326-1412) deserves mention as does the anonymous author of *The Travels of Sir John Mandeville*. Sir John Fortescue (c. 1394-1476) wrote on law and hist., his chief work being a treatise on *The Difference between Absolute and Limited Monarchy* (c. 1475) and *De Laudibus Legum Anglie* (1468-70). Reginald Pecock, bishop of Chichester (c. 1395), may in many ways be considered a predecessor of Hooker. His *Repressor of over-much Blaming of the Clergy* (c. 1450) is an elaborate prose treatise against the Lollards. Mention must also be made of Sir T. Malory's *Morte d'Arthur* (c. 1484), that glorious crystallisation of the dying spirit of chivalry.

New life was infused into poetry at the Renaissance. In 1453 the city of Constantinople had fallen into the hands of the Turks, and there had been an exodus of Gk. scholars to the W., which awoke men all over Europe to the classical arts and scholarship. The new birth in literature was heralded by two men, Henry Howard Surrey (1514-47), and Sir Thomas Wyatt (1503-42). These were the first to make a definite effort to model the literature of their native land on that of renaissance Italy. They were both courtiers, and henceforth for at least a century the court is to be the centre of literature, whereas during the Middle Ages each monastery had acted as a small centre for the gathering and diffusion of learning. To Wyatt we especially owe the sonnet. Surrey's special work was the introduction of blank verse into England, though in his hands it is awkward, and some time was to elapse before it became the medium of the world's most splendid verse. During the next half-century the only name of any importance that emerges is that of Thomas Sackville, Lord Buckhurst, afterwards Earl of Dorset (1536-1608). He helped to produce a composite work called *The Mirror for Magistrates*. It was an enlarged ed. of Lydgate's *Falls of Princes*, and the various 'Falls' were contributed by different authors. All the contributions but those of Sackville are quite negligible. These are the 'Induction' and the 'Fall of the Duke of Buckingham,' which in their

strength and lively imagery point forward to Spenser. It is to Sackville, in conjunction with Thomas Norton (1528-84), that we also owe the first blank verse tragedy, a cold Senecan creation named *Gorboduc* or *Porrex and Ferrex* (1570). But this will be referred to again when we are considering the drama. Elizabethan literature burst into fullness of bloom with the year 1579. To this year belong the first plays of the univ. wits, the *Euphues* of John Lyly (1554?-1606), and the *Shepherd's Calendar* of Edmund Spenser (1552?-1599). The *Calendar* caused Spenser to be hailed by many as the greatest poet since Chaucer. In spite of his borrowing from the *Ita.* and *Fr.*, it is clear that Spenser is under particular obligation to Chaucer, thus forging a link between the birth and the new birth of Eng. poetry. Immediately following Spenser came a glorious outburst of song, unsurpassed in any period of our hist. No convention bound the poet, and all seemed to unite as though inspired. Great as was the volume of work produced, it is true to say that there is no poet in whose work we cannot find at least a spark of the celestial fire. Many names have come down to us, and hundreds more are lost. Spenser himself, in his Irish exile, went on to add to his laurels. The first three books of the *Faerie Queene* appeared in 1592, and his miscellaneous poems at intervals. In all the writers of the period, the patriotic vein is strongly marked, particularly so in a small group of writers who devoted themselves almost entirely to England's glories—Wm. Warner (1558?-1609), Michael Drayton (1563-1631), and Samuel Daniel (1562-1619). Drayton was the author of *Polyolbion* (1613), *The Barons' Wars* (1603), and *England's Heroical Epistles* (1597); while Warner wrote the huge but dull *Albion's England* (1586). We must here pause for a while to trace the origins of that drama which was the greatest glory of the Elizabethan period. The degenerate classical drama of the first centuries had been opposed and finally exterminated by the Church and it was the Church which revived a form so useful for instruction. It is doubtless from the dramatic accounts of the Resurrection given in church on Easter Day that the 'miracle' or 'mystery' plays took their rise. They speedily passed outside the church buildings and freed themselves from ecclesiastical control, though they long retained their religious nature. The miracle plays of the Middle Ages (thirteenth century onwards) consisted of a cycle of plays, sometimes nearly fifty, dealing with events in the religious hist. of the world, from the Creation to the Last Day. Four cycles are generally spoken of: the *York. Chester, Coventry, and Towneley* cycles, each of which has certain prevailing characteristics. Pathos, humour, tragedy, comedy, realism, in fact all the qualities of the true drama, are found there in embryo. From the miracle play came the morality, where instead of Biblical, apocryphal, and historical characters, virtues and vices are represented in con-

flict for the soul of man. Greatest of the moralities is *Everyman*. The moralities generally tended to approximate to the comedy of manners. Another development was the interlude, and to this kind John Heywood (c. 1497-1580), particularly devoted himself. It was a forerunner of the comedy of manners. The post of honour as the first Eng. comedy is usually given to *Ralph Roister Doister* (1553). From about the same period dates *Gammer Gurton's Needle*. In 1561, however, was produced Sackville and Norton's *Gorboduc*, the first Eng. tragedy to be written in blank verse. It was avowedly on the Senecan model, and is stiff, cold, and didactic. The Elizabethan playwrights fall into two groups. The univ. wits, as they were called, were men of education, members of one or both of the univs. They



WILLIAM SHAKESPEARE

wrote their dramas with a definite attention to classical models, and expressed great contempt for the second school, that of the players themselves. Among the former class we may name John Lyly, George Peele, Robert Greene, Thomas Nashe, and Thomas Kyd, while Christopher Marlowe, the great predecessor of Shakespeare, though not actually one of the group, belongs to them by nature and training. Shakespeare himself is the supreme product of the second school, though a follower both of Lyly and Marlowe. John Lyly (1551-1606) was the author of a number of prose comedies, almost all of which were played by children. From him Shakespeare learnt the value of prose conversation. Marlowe's work for the drama was much more important. Hitherto the Eng. drama had lacked life and unity of purpose; a good dramatic medium was also needed. All these wants Marlowe supplied. He adopted blank verse, wrought it to a fine temper, and introduced a living tragedy. His leading characters present a dominant idea which rules the entire piece. In *Tamburlaine the Great*, his first and perhaps most characteristic play, the dominant idea is the lust for power. Consuming avarice is the keynote to *The Jew of Malta*,

while in *Dr. Faustus* greed for supernatural knowledge is the theme. In Shakespeare's earlier plays, such as *Titus Andronicus* and *King John*, Marlowe's influence is strong. The late Elizabethan and early Jacobean period was rich in dramatists most of whom were prolific. Thus Thos. Heywood (d. 1630?) is said to have had a hand in the writing of more than two hundred plays. Plays were produced once or twice and then thrown aside to make way for something new. The realms of history and imagination alike provided material to satisfy an eager public. Wm. Shakespeare (1564-1616) developed the romantic comedy, and out of the current type of 'revenge play' he evolved his magnificent tragedy; while his great contemporary, Ben Jonson (1573-1637), was writing the 'comedy of humours' with rigid adherence to the pseudo-classical unities of time and space. Jonson's influence, combined with that of Fr. models, was considerable on post-Restoration drama, while in his own day his importance in England as a literary dictator seems to have equalled that of Samuel Johnson in the eighteenth century. Almost all the great poets of the Caroline and Jacobean periods were in their youth sealed 'of the tribe of Ben.' The two collaborators, Francis Beaumont (1584-1616) and John Fletcher (1575-1625), wrote romantic plays of a sentiment more trained than in Shakespeare. Of the 'revenge school' of writers are J. Webster (c. 1600), John Marston (1575-1634), John Ford (d. 1586?), and Cyril Tourneur (d. 1626?); while George Chapman (1599-1634?), Philip Massinger (1583-1640), Thomas Middleton (1570?-1627), Thomas Dekker (b. 1570?), and Wm. Rowley (1585?-1642?) were successful in tragedy and comedy of either style. For further developments of the Eng. theatre, see under DRAMA. The Elizabethan playwrights frequently wrote in collaboration groups of two, three or more writers composing one play, and then separating. In the case of Francis Beaumont (1584-1616) and John Fletcher (1575-1625) permanent collaboration is found of so perfect a nature that it is impossible accurately to estimate the contributions of each to the partnership. James Shirley (1596-1666) is generally spoken of as 'the last of the Elizabethans.' As a dramatist he does not rank high, but in his voice the echo of the great ones who had preceded him is still to be recognised, a spark of their fire can yet be seen. His name carries the hist. of the Eng. drama down to the time of the Commonwealth, and at the beginning of this period Parliament closed all the theatres and forbade their use. When they reopened with the Restoration, a new form of drama appears looking to Fr. rather than to Eng. models. This was but natural, since, in the meanwhile, a high classical drama had developed in France, whilst the latest plays acted in the Eng. theatre, the only native tradition available, were of a most degenerate type.

If Eng. prose developed slowly in the high Middle Ages, it was because the

vernacular was used only for popular religious instruction. Lat. was the language of scholarship and administration. Fr. the everyday speech of educated people. But after the Black Death the new Eng. vernacular came to be used in the schools, the law courts and even in parliament. It was this fact which gave a new impetus to prose. Its growth in the fifteenth century was slow. Roger Ascham (1515-1568) declares his intention to use an improved prose style in the introduction to *Torophilus* (1544). Some ten years later Ralph Robinson made his trans. of St. Thomas More's *Utopia*; and in 1570 Ascham produced *The Schoolmaster*, the first Eng. treatise on education. Ascham belonged to a small group of scholars whose aim was to fashion their prose upon classical models without forcing it into classical moulds. His prose is straightforward, somewhat heavy and devoid of ornament, but lucid and pleasant to read even at the present day. The various trans. of the Bible which appeared (Wm. Tyndale, 1525, Miles Coverdale, 1536), also gave a great impulse to the development of a good prose style. Prose pamphleteering was common; two important controversies of this nature were: (1) The Martin Marprelate controversy (1588-89) in which episcopal gov. was attacked; and (2) the Harvey-Nash controversy (1592-99), between Nash the playwright and Spenser's friend and mentor, Gabriel Harvey. A certain number of prose romances were produced by the dramatists, and these are mostly modelled on the *Euphues* of Lyly, of which mention has already been made. This book, together with the *Arcadia* of Sir Philip Sidney (1590), shows the self-conscious striving after an ornamental style which characterises the period. Thomas Lodge's *Rosalinde* (1584), from which Shakespeare took the plot of *As You Like It* (1599?), is the best-known imitation of the *Euphues*. Nash's *Adventures of Jack Wilton* (1594) is a romance which already looks forward to the picaresque novel. A high level of prose is found in the Eng. *Book of Common Prayer* which appeared in 1549, but this was the work of several hands. The *Ecclesiastical Polity* of Richard Hooker (1553-1600), which appeared in 1593 (Books i.-iv.) and 1597 (Book v.), marks a high level in the magnificent Latinised style which the Elizabethans affected. Its prevailing features are the long sentence, rhetorical language, heavy ornament, and occasionally, a Latinised syntax and vocabulary. But the supreme prose work of this period is the A.V. of the Bible. Among scholars contempt for the vernacular died hard. Francis Bacon (1561) whose *Advancement of Learning* appeared in 1605, and the *History of the Reign of Henry VII.* in 1623-1626 took particular care that those works which he intended to go down to posterity should be trans. into Lat. Whereas, however, the Lat. trans. are almost unknown, the Eng. originals are now classics of the language. In the 'Latin' tradition also are a group of writers of the reign of Charles I. Bishop Jeremy Taylor (1613-67) was author

of the celebrated *Holy Living and Dying* (1650). The grand but melancholy music of Sir Thomas Browne (1635-82) was beloved of Charles Lamb, another of whose favourites was the *Anatomy of Melancholy* (1621) of Robert Burton (1576-1637). The last of the great 'Latin' prose writers was Lord Clarendon (1609-1674), author of the *History of the Rebellion* (1648). The prose works of John Milton (1608-74), the philosophical writings of Thomas Hobbes (1588-1679) and his school, and of the Royal Society led by Bishop Sprat (1635-1713) all look forward to the prose of the Restoration.

From 1600 onwards there was evolved a lyric school of surpassing delicacy and sweetness whose works have been the admiration and the despair of later lyricists. The genius in the wedding of poetry and song which was handed down from the later Elizabethans (such as Thomas Campion (c. 1575-1620), here reaches a much higher level. Even if an Elizabethan were fantastic, he was so naturally. Now art began first to be added to inspiration and then to replace it. This is the period of those whom in his *Life of Cowley* (1779) Samuel Johnson so aptly calls the *metaphysical poets*. They aimed at quaint conceits, and sought for far-fetched comparisons, though, as the learned doctor says, 'they were often worth the carrying.' And whereas some, as we have said, produced song of the greatest sweetness and delicacy, others deliberately aimed at harsh and irregular versification. It was the over-emphasising of these peculiar qualities of the school which ultimately led after the Restoration to the reaction which culminated in the accurate and polished verse of Alexander Pope. Signs of the approaching change are to be found even among the metaphysicals themselves. But their school was so widespread that it is possible, by subdivision, to include within it nearly all the poets of the reigns of James I. and Charles I. We should thus subdivide them into Pure Wits, Court Wits, and Religious or Devotional Wits, for in the parlance of the day the word 'wit' was used to describe the particular excellence of quaint erudition which was particularly admired. The great master of the school was John Donne (1573-1631), who during the first part of his life wrote a large number of love songs, but in the latter half devoted himself to religion. The Wit school also produced a fine poet in Abraham Cowley (1618-67). Among the court poets, known also as the cavalier poets, the two chief names are those of Richard Lovelace (1618-88) and Sir John Suckling (1609-42). With them poetry was the recreation of their leisure hours. Others whose names must not be forgotten are, George Wither (1588-1677), who also distinguished himself as a satirist, Wm. Cartwright (1611-43), Wm. Habington (1605-46), and John Cleveland (1613-59). Two of the best lyricists of this period are Andrew Marvell (1621-78) and Henry King (1592-1669); both were touched by the metaphysical style which also infected the devotional writers. Of these the best

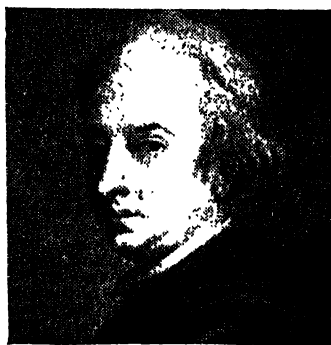
known is George Herbert (1591-1633), whose writings are suffused with a delicate spirituality. His best poetical works were pub. under the title *The Temple* (1633), to which another of the school, Richard Crashaw (c. 1610-50), wrote an introductory series, *Steps to the Temple* (1646). Henry Vaughan's (1622-95) chief work is the *Silax Scintillans* (1650-55). But the greatest lyricist of the period was Robert Herrick (1591-1674). He never lost the position he attained in his own time. The delicate flower and love pieces, which form the greater part of his *Hesperides* (1648), together with the 'pious pieces' in *Noble Numbers* (1648), testify not only to his poetic skill but also to his mastery of the technique of versification. His comparisons are often as far-fetched as those of the most pronounced metaphysician, and his vocabulary is far more curiously Latinised: but one forgets these defects in his delicate and Epicurean atmosphere. It is sometimes forgotten that all Milton's shorter pieces, by many considered to be his best work, were produced before 1642. During the next twenty years his conscience compelled him to devote his energies to politics and the prose works which dealt with matters of state. After the Restoration, he returned to the Muses and produced the two epics with which his name is popularly associated, *Paradise Lost* (1667) and *Paradise Regained* (c. 1670). His earlier work includes the *Hymn on the Nativity* (1629); *L'Allegro* and *Il Penseroso* (1633); *Comus* (1631); and *Lycidas* (1637). In these the majesty of his genius is more sustained than in the more famous works where long barren stretches occur between the peaks of sublime poetry. Nor are they marred by a certain cold mannerism which appears, for example, in the *Samson Agonistes* (1671). Moreover, the early poems do not show the coldness and hardening mannerism of a later work such as *Samson Agonistes* (1671).

After the death of Charles I., when the court was in exile, France proved a refuge for many of those who were afterwards to return with Charles II. in 1660. Here, at the famous Hôtel de Rambouillet, they came into touch with a new literary movement. Rolleau was then coming into prominence as literary dictator, and it is in his *Art poétique* (1674) that the principles and rules of the classical poetry and drama are laid down. A reaction had set in against the freedom of the preceding century and its consequent extravagances. A return to primitive simplicity was sought, and the classics were now held up as the only models of excellence. Horace and Aristotle were now become the legislators of Parnassus. Corneille had already lifted the Fr. classical drama to noble heights, and it was under his influence that the Restoration drama began. The entire absence of human beings has been mentioned as the chief feature of the Cornelian drama. Every one is drawn more than life-size, virtue and vice are both thrown into high relief. The leading character is actuated by one motive, and this principle, applied in a slightly lesser

degree to all the characters, materially simplifies human life for the purposes of the stage. The hero of the Restoration drama dominated the stage throughout the play, whence the adjective heroic applied to the drama itself and to the decasyllable couplet. Sir Wm. Davenant, in his *Siege of Rhodes* (1656), opened the series of these plays, but for long their principal exponent was John Dryden (1631-1700), among whose heroic plays may be named *Tyrannic Love* (1669), and the *Conquest of Granada* (1670). These plays are characterised by a brilliant rhetoric which sometimes oversteps the limits of eloquence, and by an extravagant emphasis on 'honour.' The best of Dryden's plays in this style is *All for Love* (1678), written in blank verse, of which Dryden had once been an opponent. It is as Dryden says, the only play he had written for himself, and shows that he had tired of the ranting style popular with the audiences of his day. The play is an attempt to rival Shakespeare's *Antony and Cleopatra*, dealing as it does with part of the situation of the older play. A comparison of the two will show the main points of difference between the romantic and classical dramatic styles better than would a long exposition. As the tragedy of Corneille was followed by Molière's *Comedy in France*, so in England the heroic drama was succeeded by the comedy of manners, of which Wm. Congreve (1670-1729) was the most brilliant exponent. Johnson quotes a passage from his *Mourning Bride* (1695) as the greatest in Eng. drama. But Congreve's best comedies are *Love for Love* (1697) and *The Way of the World* (1700). They are pictures of contemporary 'gallant' life, depending for their success upon brilliant dialogue written around well-worn plots. Restoration drama is marked by a reaction against the moral restraints of puritan control. Before Congreve, Sir George Etherege (1635-91) had made an attempt to write comedy on somewhat similar lines, but with little success. Wm. Wycherley (1640?-1716), Sir John Vanbrugh (1664-1726), and George Farquhar (1678-1707) were also able writers of the comedy of manners, though none have Congreve's sparkling brilliancy.

To trace the development of poetry during this period it is necessary to refer back to the first half of the century. During this period a small group of writers had kept alive the Spenserian tradition both in thought and versification. The two Fletchers, Giles (1581-1623) and Phineas (1582?-1665), were its leaders, and their most noteworthy disciples were George Wither (1588-1667) and Wm. Browne (1591-1643). After them the style was virtually abandoned until the romantic revival. It was Dryden who perfected the heroic couplet. He is considered by many as superior in the use of this metre to Pope, who rejected his predecessor's variation of the decasyllable with the Alexandrine couplet. After the death of Dryden (1700) there is for a short while an extremely barren period in poetic hist. There was left no great or

even moderate poet, if we except Matthew Prior (1664-1721), who produced some good lyrics. On account of the repute in which she was held by Wordsworth, we may also name Lady Anne Finch (d. 1720?), Countess of Winchelsea, who is almost entirely unknown except for the extracts preserved by her admirer. The next great name is that of Alexander Pope (1688-1744), early in his career he had been advised to strive after a 'correct' style, which none of the greatest poets of the past had achieved. He first came into prominence with his *Essay on Criticism* (1711). This was followed by the *Dunciad* (1728 and 1742-43), a savage satire on his opponents among the 'Grub Street' writers; the *Rape of the Lock* (1711 and 1714), considered to be the best



JOHN DRYDEN

occasional poem ever written; the translations of Homer (*Iliad*, 1715-20; *Odyssey*, 1725-26), done purely for financial reasons; and the *Essay on Man*, in which he versified the philosophy of his friend Lord Bolingbroke. The couplet which he used was particularly adapted to epigram, and in this he excelled. His *Essay on Man* has furnished a surprising number of popular quotations. The aim of the Popean school was not so much originality as polish and neatness; the manner of expression was the most important consideration. Its poets aimed at saying 'what oft was thought but ne'er so well expressed.' We have said that at the time when Pope began to write there was no poet of even mediocre powers. Pope perfected a method by which even the mediocre could write accurate and even good verse. He was, therefore, universally followed, and the classical style, with its couplet, dominated Eng. poetry until the end of the eighteenth century. It is true that during the whole of that time we find undercurrents of what we commonly call romanticism. The two Whartons protested against the devotion to satiric verse and urged the superiority of the imagination. Thomas Gray (1716-1771) and William Collins

(1720-1756) are the two finest of the poets who did not follow the prevailing fashion, but their output is not sufficiently large to enable either of them to take rank as a great poet, though each shows considerable genius in the little work he did. James Thomson (1700-48) is a more obvious predecessor of the early romantic poets. He wrote a series of descriptive poems in blank verse called *The Seasons* (1726-30), the popularity of which shows how strong was the sympathy with Nature. Thomson also wrote *The Castle of Indolence* (1748) in Spenserian metre. Ambrose Phillips (1675?-1719) and John Gay (1685-1732) wrote some good lyrics, and the latter also produced the famous *Beggars Opera* (1727) and its sequel. As the eighteenth century proceeded, however, there was increasing evidence of a new poetic spirit in such works as Macpherson's *Ossian* (1763) and Percy's *Reliques of Ancient English Poetry* (1765).

The prin. work, however, of the period we are now considering was its fashioning and perfecting of the modern prose style. Hitherto all the great prose writers had used the magnificent but cumbrous Lat. style. Suitable though this was to imaginative work, it had to undergo a transformation before it could be a medium adapted to the ever widening field of knowledge. Here it was that Fr. influence was entirely good, for Fr. prose had already some centuries upon which to look back. Its prin. characteristic was the short sentence, equivalent, one may say, to the couplet in verse. Classic severity led also to the diminution and even the banishment of ornament, and in most cases this was a great advantage. It further rendered the differentiation between prose and poetry more distinct. Henceforth, none could hold with Sir Philip Sidney that prose might well be poetry. Dryden was the first to write the new prose, and anyone reading his critical essays and prefaces will at once perceive its extreme modernity and lucidity. It has been said that the writers of the old school wrote as if they wished merely to unburden their minds, sometimes even delighting in obscurity. Dryden primarily considers his readers. He writes only that the may convey his ideas to their minds. The vehicle which Dryden introduced was polished and made more supple by Sir Wm. Temple and his followers, who formed what is known as 'The Gentle School.' Their services to Eng. prose were considerable. Daniel Defoe (1661?-1731) was one of the first to apply this new instrument to a variety of uses. As a journalist he anticipated many features of the modern Press, and was not unknown as an essayist and rhymster. His best known work is *Robinson Crusoe* (1719), an immediate precursor of the modern novel. The essay reached its highest level in the *Taller* (1709), written by Richard Steele (1672-1729) with the help of Joseph Addison (1672-1719) and others, and in the *Spectator* (1711-14) written by Addison with the help of Steele and other literary men of the day. Steele and Addison attempt to treat life

and learning in such a way that they will be interesting to all intelligent people, and thus to widen the bounds of education. They were the first to address themselves to women as forming the majority of their readers. The influence of these papers was greater, however, on morals than on literature. The work of Dean Jonathan Swift (1667-1745), with his severely plain style and his savage and sometimes inhuman satire, must not be forgotten. *Gulliver's Travels* (1726) is one of the few books that interests all ages, and this very fact shows the author's consummate skill. The style of Lord Bolingbroke (1678-1751), though polite, is somewhat superficial, while the exact contrary must be said of that of Bernard de Mandeville (1670-1733) in his famous *Fable of the Bees* (1714). The work of Samuel Johnson (1709-81), though great in many ways, must be considered rather retrograde in point of style, for it shows much affinity with that of the previous century. As the first lexicographer, and as the writer of the *Lives of the Poets* (1779-81), a great debt is owing to him, though the Johnson of the *Rambler* might well have been spared. Boswell's *Life of Johnson* (1791) is one of the masterpieces of the language.

The middle of the eighteenth century saw the rise of the Eng. novel, which has grown to embrace every department of life. Samuel Richardson (1689-1761) inaugurated the novel with *Pamela* (1740), a psychological study with a somewhat morbid 'love' interest, written in the form of letters. Richardson improved on his first attempt in *Clarissa Harlowe* (1747-8). Anger at Richardson's morbidity led Henry Fielding (1707-54) to commence *Joseph Andrews* (1742) as a parody. His interest in it, however, led him to continue it as a serious work. This was followed in 1749 by the epoch-making work, *Tom Jones*, still considered by many the best novel in Eng., on account of the excellence of the plot. Tobias Smollett (1721-71) and Laurence Sterne (1713-68) complete the four who formed the Eng. novel. Towards the end of the century Fanny Burney's *Evelina* (1778) and *Cecilia* (1782) introduced the type of novel which was continued by Jane Austen (1775-1817) and Maria Edgeworth (1769-1849). The drama during this period steadily deteriorated, and has never since recovered. Only *The Good-Natured Man* (1768) and *She Stoops to Conquer* (1772), by Oliver Goldsmith (1730-74), need be mentioned.

The year 1798, when *Lyrical Ballads* by Wm. Wordsworth (1770-1850) and Samuel Taylor Coleridge (1772-1831) was pub. is an epoch-making date in literature. This work inaugurated the romantic movement, of which the immediate predecessors had been Wm. Cowper (1731-1800), Wm. Blake (1757-1827), and George Crabbe (1754-1832). In Scotland, Robert Burns (1759-96) had already re-kindled the expiring flame of Scottish poesy. He had much in common with the Eng. romantics. During the next century the bounds of literature extend so widely that it is impossible to cover the

whole field of thought. The most that can be done is to indicate the main lines of development, and to refer to works which deal with the period in detail. Coleridge, whose actual production was small, had a powerful influence on the movement's development by his critical writings. His *Biographia Literaria* (1817-1847) is still the classic of constructive criticism. In the next generation, poetry expanded to cover the whole of human life. Sir Walter Scott (1771-1832), Lord Byron (1788-1824), Percy Bysshe Shelley (1792-1822), and John Keats (1795-1821), though they had much in common, brings each his own offering from the treasury of genius. Edward Gibbon (1737-94)



THOMAS HARDY

was followed by a group of historians professing to found their theories upon original research. But the most important feature of the literature of this period was the novel. Sir Walter Scott achieved great popularity with the historical novel of which he was the founder. He was followed by Bulwer Lytton (1803-73) who was succeeded in turn by Charles Dickens (1812-70). Dickens has been blamed for lack of artistic form; but he brought to his work an unparalleled observation of human life in its every mood. He was moved by a philanthropic idealism which is also apparent in the novels of Mrs. Gaskell (1810-66); of the Brontë sisters, Charlotte (1816-55) and Emily (1818-48); of Charles Kingsley (1819-75) and of Benjamin Disraeli (1804-81). (See BEACONSFIELD.) Something allied to the idealism of these authors came with the Oxford Movement. In poetry, its greatest result was John Keble's *Christian Year* (1827), in prose the beautiful and haunting

style of Cardinal Newman, best shown in his *Apologia* (1864). Meanwhile an unalloyed realism was appearing in the novels of Wm. Makepeace Thackeray (1811-63), a clear-sighted, ironic and penetrating writer, of Anthony Trollope (1815-82); Charles Reade (1814-84), and George Eliot (1819-80). These were followed by Thomas Hardy (1810-1928) and George Gissing (1857-1903), both governed by a sombre philosophy, the one of fatalism and the other of despair. In poetry they are allied to James Thomson (1834-82), while Thomas Hardy, himself a great poet, has dominated all that is best in twentieth-century endeavour. Samuel Butler's (1835-1902) novel *The Way of All Flesh* (1903), appeared posthumously; but Butler, a philosophical writer, shares in the reaction against the mechanism of his contemporaries. So also does George Meredith (1828-1909), but with more faith in the kindness of nature, a faith spiritually expressed in his poetry. As a novelist he is master of psychological analysis. Although the novel figures so largely in nineteenth century achievement, criticism and the essay also flourished after a dogmatic beginning with Francis Jeffrey (1773-1850) and the Edinburgh reviewers. A sounder theoretic criticism was established by Wordsworth (1770-1850) and Coleridge (1772-1834), followed by the practical criticism of Wm. Hazlitt (1778-1830). The essay achieves permanent distinction through Charles Lamb (1775-1834), Thomas De Quincey (1785-1859) and Leigh Hunt (1784-1864); nor was the prose of Walter Savage Landor (1775-1864) without lasting influence. Matthew Arnold (1822-88), who is much indebted to the Fr. critic Sainte-Beuve, inaugurated a new school of criticism, which henceforward ranks as a true department of literature. In the writings of Walter Pater (1839-94) literature is regarded no longer as an isolated art, but as part of one whole in which painting, music, sculpture, etc., are concomitants.

In history the outstanding names are Henry Hallam (1777-1859), Thomas Carlyle (1795-1881), Lord Macaulay (1800-59), and James Froude (1818-94). In the works of all these, excepting only Hallam, the literary and philosophical elements are more prominent than the historical.

The names of Milman, Grote, Buckle, Freeman, and Green are also worthy of mention. The drama, in spite of a flood of imitations of the Ger. plays which came with the early romantics, never rose again into high levels of either tragedy or comedy.

The poetry of the Victorian age continues the romanticism of the century's beginning, tending with Alfred Lord Tennyson (1809-92) towards a perfecting of form and with Robert Browning (1812-89) towards a preoccupation with psychology. Allied to these great poets are others: T. L. Beddoes (1803-49), Elizabeth Browning (1806-61), A. H. Clough (1819-56), Coventry Patmore (1823-96), and Christina Rossetti (1830-94). With Matthew Arnold's poetry a refined classicism was introduced, while in the

middle of the century the Pro-Raphaelite movement in painting spread to literature through the genius of D. G. Rossetti (1828-82) and Wm. Morris (1834-96), although the latter sought his inspiration more in medievalism. The critic of the artistic revival and the apostle of beauty was John Ruskin (1819-1900).

Towards the end of the century romantic poetry became imbued with Fr. symbolism, and A. C. Swinburne (1837-1909) possessed a unique capacity for verbal music. Swinburne in poetry and Pater in criticism were the patron saints of the aesthetic school of the 'nineties, in which Oscar Wilde (1856-1900) was the most notable. George Moore (1852-1933) in his work combined the aesthetic doctrine of art for art's sake with the realism of the Fr. novels of Zola, while having something in common with the Celtic Revival. If his art and religion somewhat obscure his intention, he is essentially a story-teller. The Fr. naturalism which Moore imbibed was assiduously avoided by Stevenson (1850-94) in his adventure novels. The typical poet of the Celtic Revival is W. B. Yeats (1865-1939), who was also a playwright, but in the plays of J. M. Synge (1871-1909) Irish mysticism is tempered with a humorous observation of Irish life. Other poets of the Celtic Revival are Lionel Johnson (1867-1902), George Russell ('A.E.') (1867-1935) Padraic Colum, James Stephens, Katharine Tynan, etc. Gerard Manley Hopkins, an Eng. poet sent to Ireland by the Society of Jesus, is too individualistic in his poems, 1876-89, to belong to any school, but his rhythmic experiments have influenced a succeeding generation since his poems were first pub. posthumously in 1918. Tennyson was succeeded as Laureate by Alfred Austin (1835-1913) and after him by Robert Bridges (1844-1929), with Tennyson one of the greatest of England's practising Laureates. Symbolism was carried over into the twentieth century by John Davidson (1857-1909) and Arthur Symonds (1865-1945), while Francis Thompson (1860-1907) was, like Hopkins, a Rom. Catholic and, like him, an adept in verbal music. Thomas Hardy in *The Dynasts* (1904-8) reached epic grandeur, other notable epics of the twentieth century being *The Dawn in Britain* (1906-7), by C. M. Doughty (1813-1926), the author of *Travels in Arabia Deserta*, and *The Torch-Bearers*, an epic by Alfred Noyes, completed in 1930. Rudyard Kipling (1865-1936) became the poet of an imperialism which has become somewhat discredited for its ultra-jingo note, combined with a love of Eng. soil; he is also known as a novelist and short-story writer. As an imperialist he is allied to the poets W. E. Henley (1849-1903) and Sir Henry Newbolt (1862-1938); but socialism has found its spokesmen in G. B. Shaw and H. G. Wells (1863-1946), and also, but of a more medieval guild variety, in Chesterton (1874-1936) and Belloc. The open-air school of nature writers must also be mentioned: Richard Jefferies (1848-87), W. H. Hudson (1846-1922), and Edward Thomas

(1878-1917), poet and essayist; while a forerunner of these authors is George Borrow (1803-81).

Several poets writing about 1910 are classed in the 'Georgian group': T. Sturge Moore; W. H. Davies (1870-1910); John Masefield (laureate, 1930); W. W. Gibson; Lascelles Abercrombie (1881-1938) who, as a critic, wrote much on the nature of great poetry, which obtained recognition as work of real value; Lady Margaret Sackville; James Elroy Flecker (1884-1915); Sir John Collings Squire; Rupert Brooke (1887-1915); Humbert Wolfe (1885-1940); Edmund Blunden, whose collected verse was pub. in 1941. He, like Chancer and Hardy, is steeped in the English soil, reminiscent without bitterness, expressive of the harmony which he sees amid the rancour and hatreds of to-day. The poetry of Walter de la Mare is pervaded by a note of sadness and mystery, showing a pre-occupation with a world of dreams, a twilight space or region of intangible secrecies that lies just beyond the edge of sense. But while his earlier poems showed marked simplicity, in the later the craftsman at times seems to overwhelm the poet. The note of the younger members of the Georgian group was changed by the First World War which bred its own generation of poets: Siegfried Sassoon; Osbert, Sacheverell, and Edith Sitwell; Wilfred Owen (1893-1918); Robert Nichols; Robert Graves; Charles Sorley (1895-1915); and Isaac Rosenberg (1890-1918) whose collected works were pub. in 1937. His influence on the younger generation of poets and the praise of his work by T. E. Lawrence and Lascelles Abercrombie indicate the range of his appeal. His mastery of imagery is exemplified in such pieces as *Moses*, *The Unicorn*, and *Dead Man's Dump*.

The young poets of the pre-1930 period, the group that came from Oxford in the first years following the war, are the poets of this day—Auden, Spender, MacNiece and Day Lewis. All were social idealists drawn to active sympathy with the Sp. Civil War and left-wing political parties, but later, became less political in outlook. Auden, leader of the group, had adopted Amer. citizenship when he pub. vols. of poems and one vol. of didactic poetic drama. Stephen Spender, with a large following among the young, is perhaps the most prominent figure of the group after Auden. Day Lewis writes conventional modern poetry of good quality. MacNiece has a fine talent in a light vein. Among the generation of poets that have emerged during the period of the late war must be mentioned Dylan Thomas, a Welsh poet writing, in Eng., emotional verse instinct with a rare passion, and Vernon Watkins, also Welsh, who has some of the qualities of his fellow countryman; and among the younger poets too should be mentioned Kathleen Raine. Also may be noted a group of Anglican poets who reveal the influence of T. S. Eliot's advocacy of the sect. Religious dramas by these poets, among whom are Norman Nicholson, Anne Ridler, and Ronald Duncan have been performed at

the Mercury Theatre. Yet others among many writers of Eng. verse are John Betjeman, writer of sentimental poems about Eng. vills. and churches, and Sidney Keyes, a young poet of high talent who was killed in the late war. Many poets of the older generation continued to produce good verse during the war—Herbert Read, Edmund Blunden, Walter de la Mare, and Siegfried Sassoon—though their verse does not suggest the contemporary world. By common consent the influence of T. S. Eliot among students suggests that there must be something seriously wrong with Eng. poetry which in a generation has produced no poet of a stature equal to Eliot, an Amer. (now a naturalised Brit. subject) who 'having been the iconoclast of a body of dead poetic convention twenty years ago, now stands cathedral-like as a symbol of tradition, the past, the values of a civilisation away from which we know that we must proceed towards a very different world, a very different kind of sensibility' (Kathleen Raine). His *Murder in the Cathedral* (1935) is drama reached through poetry with a hidden dramatic quality, but without the incorporation of the moral in the matter—wherein it differs fundamentally from the verse dramas of Byron and Browning. To an older generation his name suggests a difficult, unattractive poetry—*The Waste Land* and *Samson Agonistes*, the utterance of dynamic despair at the future of the world: yet to a younger generation, Eliot is a symbol of the old European culture, of the Christian church, of political conservatism—everything severely classical and retrospective. To understand the position of Eng. poetry to-day demands an appreciation of the position of Eliot, who, apart from his poetry, is perhaps the leading critic in the contemporary literary world, the one poet whose utterance touches universals rather than a particular time or mode. Edith Sitwell however is foremost among the others and her three vols. of verse pub. since the war have confirmed her position as a poet of rare accomplishment, whose work posterity will recognise as essentially 'early twentieth century.' Auden's vol. of *Poems* attracted the attention of those anxious for the present destiny of Eng. poetry. In *The Orators* (1932) the technical achievement is even more surely fixed, while rhythms and allusions are handled with rare skill. In *The Use of Poetry and the Use of Criticism* (1933) T. S. Eliot surveys the relation of criticism to poetry in England and gives valuable hints on the appreciation of poetry, the function of poetry and of criticism and the relation of literature to civilisation and of poetry to politics and religion. The work is an important landmark in Eng. criticism worthy to be ranked with that of Ben Jonson, Sidney, Dryden, Dr. Johnson, Matthew Arnold, and Walter Pater.

Moving nature descriptions against a background of war couched in a distinctive style are the feature of *Twentieth Century Psalter* (1943) of Richard Church which embodies the poet's reactions to life in the months of attack on Britain.

B. Ifor Evan's *Tradition and Romanticism* (1940) helps to resolve the old feud between the classical and romantic schools by side-tracking the arguments and tracing the conceptions of poetry held by the poets themselves. Also in the field of the most recent belles lettres may be noted Walter de la Mare's *Pleasures and Speculations* (1910)—essays on subjects which give scope for the author's imagination and fancy which invest most things in an aura of novelty. G. Wilson Knight's *Starlit Dome* (1941) are 'studies in the poetry of vision' emphasising that in interpreting poets and poetry, symbols are the significant element, for these and imagery illustrate the poet's particular angle of vision. George Sampson's *Concise Cambridge History of English Literature* (1911) is a reliable guide, well in the English literary tradition; and in the same sphere is *English Literature in the earlier seventeenth century* (Oxford History of English Literature) by Douglas Bush (1945). Eng. belles lettres are further enriched by the *Death of the Moth* (1942) in which Virginia Woolf, almost in the manner of Sir Thomas Browne or Charles Lamb, reveals her gift of transmuting her own personal meditations into literature though she is unique in capturing those more elusive shades of thought which are mostly gone before they can be really apprehended. Robert Lynd's essays on multifarious topics, contributed for many years to the *New Statesman and Nation* under the nom. de plume of 'Y. Y.' revealed something of the happy facetiousness of Lamb.

Throughout the decade before the late war and during the war much admirably-written history was added to E. L. The *Cambridge Ancient History*, Vol. XII, *The Imperial Crisis and Recovery, A.D. 193-324* (1939), completed a monumental series pub. over the period 1923-39 and a similar great co-operative enterprise is *The Cambridge Medieval History*, vol. viii, of which, *The Close of the Middle Ages*, appeared in 1936. In these vols. the hist. of each special period is told with great skill and interest, and with clear suggestions on the true origins of many modern political institutions and theories and valuable for the maturity of judgment of the standard authorities of the period. Arnold Toynbee's *A Study of History* (1934-39) is a standard work on the evolution of civilisations revealing wide erudition in the handling of most problems of hist., whether ant. or modern. G. M. Trevelyan's *Ramfilles and the Union with Scotland* (1932), based firmly on contemporary records, is splendidly descriptive and vivid: it is part of a trilogy which is already a standard work on the reign of Queen Anne. The third vol., *England under Queen Anne* (1934) is a masterly survey and a classic, generally, in Eng. historical literature. The same historian's *English Social History* (1944), which was an eagerly-sought work as soon as pub., is a portrayal of six centuries of social hist., from Chaucer to Queen Victoria written with great felicity of style.

Recent biography in E. L. has produced

work of varying merit and literary treatment. History and fiction have met in a form of biographical writing, exploited by Lytton Strachey (1880-1932), Philip Guedalla (1889-1944) and others. It introduces elements conventionally regarded as outside the legitimate sphere of biography and tends to distort and denigrate the portrait of its subject. *Eminent Victorians* is an example of this kind of biographical writing. On the other hand Winston Churchill's *Marlborough* (1932), a large-scale work, which purports to rehabilitate the character and career of a soldier and historical figure reputedly misinterpreted by Macaulay, is remarkable for its lucid and attractive narrative style, and the vivid boldly rhetorical sketches of the wild youth and early military career of his subject. Herbert Bell's *Lord Palmerston* (1936) too, embodies the substantial results of clear and documentary research as opposed to bright biography of unequal worth. Similarly D. M. Low's *Edward Gibbon* (1737-1794), pub. in 1937, the best modern life of Gibbon, sets a standard of soberly-written biography in an age much degraded by fictional irrelevancy. Sir Osbert Sitwell's autobiography, *Left Hand, Right Hand* (1943) essentially a fantasy of a bygone decorative form of English life, is written with a rare distinction of style eminently suited to its matter.

E. L. sees no falling-off in acutely-written works in the category of religion and philosophy or kindred subject-heads. Sir Charles Sherrington's *Man on his Nature* (1910) marks the entry of a physiologist of great repute into the realm of metaphysics. The work is an exposition of certain aspects of biological science, imparted with rare literary art and deals, more particularly, with those frontiers of natural science which coincide with those of natural theology. In his eminently readable *History of Western Philosophy and its connection with Political and Social Circumstances from the Earliest Times to the Present Day* (1946), Bertrand Russell gives accounts of doctrines, and sometimes brief summaries of the chief works, of over thirty influential European philosophers. His conclusions tend to conform with a not unduly altered general point of view. He does not aim here at furnishing one more conventional textbook of the history of thought; rather is the work an exposition of his philosophy with reference to such history. The literary style is clear, alive, and acute and, with its seasoning of anecdotes and pleasantries, seems intended mainly for the general reading public. In the manner of a literary pastiche is G. B. Shaw's *The Adventures of the Black Girl in her search for God* (1932)—a parable to show the different conceptions of the deity that may be found in the world from the phases of God in the Old and New Testaments to the God of Natural Science, written in excellent prose in a clear racy style. Equally mordant irony marks his work *Everybody's Political What's What* (1944) which may be mentioned here; it is a summary of the doctrines which Mr. Shaw has declared for the last half

century, but, if a remarkable literary *tour de force* for a man of eighty-eight years of age, its denigration of British political institutions argues a prejudiced if characteristic outlook.

With the turn of the century competent craftsmen in novel-writing are numerous and often start some particular fashion. Henry James, George Moore, D. H. Lawrence are not among the more generally popular novelists but they are among the most novel for their time and artistically adventurous, as are also Aldous Huxley, E. M. Forster, Charles Morgan, Virginia Woolf, Dorothy M. Richardson and James Joyce. None of these are traditionalists or followers of the main road of Eng. fiction, but are experimentalists turning fiction to new purposes. The mainstream of the novel during the past quarter of a century or more was fed, not by the experimentalists, but by such writers as Joseph Conrad (1856-1924), Arnold Bennett (1867-1931), John Galsworthy (1867-1933), H. G. Wells (1868-1946), Hugh Walpole (1884-1941), Somerset Maugham and later J. B. Priestley. Henry James (1843-1916), a writer of somewhat narrow outlook, is a psychological novelist, with a unique style full of mannerisms yet lucid for those who will persevere with him. D. H. Lawrence's prose has in its time produced rare effects; it is a prose that bleeds with compassion and it is often powerful and impulsive, but saturated with sexual images. Few writers have his power of vividly communicating physical sensations or convey the idea of so great a mastery of the dark region that exists somewhere between thought and feeling. Like Lawrence's work that of Virginia Woolf (1882-1942) constitutes a class in itself. Subtlety of structural technique and sensitiveness of character evocation mark her novels, as also keen sensibility and lyrical power. If she has added no character to Eng. fiction, she has contributed pages of rare quality to Eng. prose; and if her highly impressionistic work, as exemplified in her short stories, lacks external drama, it is because she rates the life of the mind higher than the movement of the body. James Joyce's *Ulysses*, which records in one large book only one day in a man's mental life, has been justifiably described as the *reductio ad absurdum* of the extreme subjective method. He and Dorothy Richardson have carried the method as far as it can usefully go or farther. Of greater value in the art of intercepting the 'stream of consciousness' is the work of Virginia Woolf for the reasons given above. The root-idea of psychoanalysis—the most significant contribution to psychology that has been made in the last hundred years—has inevitably been exploited by innumerable modern novelists, though, as it has been well said, Samuel Richardson was really the true father of psychological fiction. May Sinclair may be mentioned as one novelist whose later work at least betrays the influence of Freud's doctrines. Yet other writers of the 'stream of consciousness' school are T. E. Powys, but with an obsession for single-track minds,

and Wm. Faulkner. Also among the modernistic novelists, though in a very different vein from Joyce, are Evelyn Waugh, Charles Williams (1886-1945) and H. M. Tomlinson, the first and last being at times brilliant essayists in atmospheres and symbols while all three are agreeably free from the pretentiousness of the ultra-experimentalists. Aldous Huxley, as the disillusioned voice of modern consciousness, ruthlessly satirises a machine-made society in extravagant and witty characterisation and with encyclopaedic knowledge. Charles Morgan's novels are remarkable for delicate workmanship, convincing characterisation and brilliant development of relevant spiritual values. E. M. Forster stands alone and chiefly for his novel *A Passage to India*, which will live as a social-political tract if somewhat biased, as a psychological novel if prejudiced by over-mystification, and as a superb character study of people of one race writing of another. It is difficult to do justice to the elusive charm of his style and to the new and surprising beauties that teem in its pages. Reverting to the traditionalists in Eng. fiction—Arnold Bennett's work has sometimes been described as largely the apotheosis of the commonplace; but his best achievements are unassailable and may be regarded as inspired by Zola and Balzac and other leading Fr. writers, of whom he had a profound knowledge. Galsworthy's *The Forsyte Saga* and *A Modern Comedy* constitute perhaps the most magnificently convincing social hist. of our time. In them he exhibits with extraordinary genius the forms and expressions of thought of a class that are worshipped by none so much as they worship themselves,—the acquisitive upper middle class. The Forsytes may be described as the best mirror in Eng. literature of the social existence and mentality of a family whose members are interesting largely by reason of the inevitable accident of their birth. The novels of the very versatile H. G. Wells, though not experimental in the accepted sense, fall easily into three or four well marked phases or categories—the highly-original pseudo-scientific romances of his early years as a novelist; the quasi-autobiographical novels of wistful humour like *Kipps* and *Mr. Polly*; and sociological novels, in which the true function of the novelist is really lost in discursive socio-political essays shot through with interludes of graphic fiction. The most developed work of Hugh Walpole is, generally speaking, dominated by the gorgeously-tapestried work in the tetralogy of *Rogue Herries*, *Judith Paris*, *The Fortress*, and *Vanessa*, an achievement which is perhaps the finest and most sustained product of the romantic revival of recent times giving new life to historical fiction. Precise character-delineation and supreme technical finish mark Somerset Maugham's novels and short stories, the former of which sometimes take the form of a series of incidents yielding a cynical philosophy towards life or, as in his *Theatre*, reflect a debonaire satirist's picture of a petty world seen through the objec-

tive spectacles of an adroit moralist. Conrad's adventure novels, with firsthand experience of the sea and seamen, are remarkable for their style and are among the finest literary achievements of this century. J. B. Priestley has restored to the Eng. novel the picaresque elements of Smollett's day combined with the robust and expansive humour of Dickens. Most of the novels of J. D. Beresford are chronicles which, by contrast with the period novel, attempt a picture of society valid for all time; and a similar universality of delineation and appeal characterise the stories of Compton Mackenzie, Frank Swinnerton and R. H. Mottram, the first named also writing 'chronicle' novels while Mottram's chief work, *Spanish Farm*, rises to epic heights with its treatment of the central character as the symbol of martyred Belgium through the centuries. Robert Graves is a novelist who makes an impressive attempt at historical reconstruction in the guise of fictional autobiography. Fictional biography against a background of philosophy is a favoured literary device of some Eng. writers as e.g. David Garnett. Richard Aldington's novels are reflections of contemporary problems and the work of a writer who is also a poet of distinction. James Stephens, in prose and verse alike a poet, is an imaginative writer who retells in English the auct. and lovely legends of Ireland with the technique and in the spirit of an accomplished modern novel. Another novelist whose work is the expression of a poetic temperament is Francis Brett Young. A. J. Cronin may be classed among the social reformative novelists, notably as exemplified in *The Citadel*. Richard Hughes's novels of adventure on the seas are characterised by exactness and brilliance of description and may almost be regarded as allegories. Sombre writing in the vein of Tolstoy, both as to choice of theme and treatment, is the keynote of the work of H. E. Bates, which shows a keen flair for rural atmosphere. Richard Llewellyn, in a successful first novel (*How Green is My Valley*, 1938) exploits the ordinary pleasures of peasant existence in hues romantic yet true to life. Other novelists in E. L. of the past two decades include Louis Golding, a writer of novels of considerable power and tragic beauty; Wm. Gerhardt, with a flair for copious characterisation and digressive comedy; Harold Webber Freeman; Gilbert Cannan; A. M. Monkhouse; and A. P. Herbert, who is also a modern Euphuist in the art of writing witty topical verse. E. M. Delafeld (1880-1943), Margaret Kennedy, Rose Macaulay, Naomi Mitchison, Ethel Mannin, Violet Sackville-West, Theodora Benson, Storm Jameson, Sheila Kaye-Smith, and Mary Webb (1883-1928) are women authors whose novels, eminently readable, can yield all the wit that may be required by way of counterbalance to the proselytising seriousness of much modern male talent. Mary Webb's novels, which for some time were unrecognised, were lifted from obscurity by the eulogies of J. M. Barrie and Earl Baldwin. They are of considerable

power, and in their themes suggest the outlook of Thomas Hardy. Katherine Mansfield is regarded by some as the one great short story writer of undoubted genius in the present century. Somerset Maugham and Walter de la Mare are other leading writers whose short stories reflect a quality of mind original in modern literature. An over-wrought style characterises the otherwise admirable short stories of C. E. Montague. Other short story writers are A. K. Coppard—the best of whose hard-etched tales have a strong aroma of reminiscence and unusual plots—Martin Armstrong, P. G. Wodehouse (humorous), Ethel Colburn Mayne, W. W. Jacobs—who, however, really belongs to an older generation—and in this sphere should be mentioned also the Father Brown stories of G. K. Chesterton.

BIBLIOGRAPHY.—*Cambridge History of English Literature* (edited by Ward and Waller), 1905 ff.; H. Hallam, *Literature of Europe in the Fifteenth, Sixteenth, and Seventeenth Centuries* (4 vols.), 1837–39; G. Craik, *Compendious History of English Literature and Language*, 1861; H. Taine, *History of English Literature* (trans. by Van Laun), 1871; W. Minto, *English Prose Literature*, 1872; T. H. Ward, *English Poets* (2nd ed. 4 vols.), 1883; H. Morley, *First Sketch of English Literature* (enlarged ed.), 1886; Stopford Brooke, *History of English Literature to the Accession of King Alfred*, 1892 (new ed., 1901); G. Saintsbury, *Short History of English Literature*, 1900 (new ed., 1903, re-issue 1930), and *Later Nineteenth Century Literature*, 1907; W. Courthope, *History of English Poetry*, 1895; Morley, *Library of English Literature* (5 vols.), 1876–82; and series of *English Writers*; Chambers, *Cyclopaedia of English Literature* (new ed. 3 vols.), 1901; G. Craik, *English Prose Selections* (4 vols.), 1892–94; Sir A. T. Quiller-Couch, *Studies in Literature* (3 series), 1918–33; W. L. Phelps, *The Advance of English Poetry in the Twentieth Century*, 1920; W. A. Neilson and A. H. Thorndike, *A History of English Literature*, 1921; O. Elton, *A Survey of English Literature* (2 vols.), 1920, 1928; Sir E. Gosse, *A Short History of Modern English Literature* (rev.), 1924; G. K. Chesterton, *Victorian Age in Literature*, 1925; S. T. Williams, *Studies in Victorian Literature*, 1925; G. Bullett, *Modern English Fiction*, 1926; O. Williams, *Some Great English Novels*, 1926; E. A. Baker, *The History of the English Novel* (10 vols.), 1924–39; E. Legouis and L. Cazamian, *A History of English Literature*, 1930, 1933, 1947; E. Muir, *Transition*, 1926; A. C. Ward, *Twentieth-Century: the age of interrogation*, 1928; J. B. Priestley, *The English Novel*, 1931; N. Collins, *The Facts of Fiction*, 1932; Sir Paul Harvey, *The Oxford Companion to English Literature*, 1932, 1937; J. W. Cunliffe, *English Literature in the Twentieth Century*, 1934; F. Swinnerton, *The Georgian Literary Scene*, 1935, and *Modern Fiction*, 1939; E. Muir, *Introductions to English Literature*, 1939; R. L. Sharp, *English Literature: from Donne to Dryden*, 1940; B. Ifor Evans, *A Short History of English*

Literature, 1940; A. Comfort and J. Bayliss, *New Directions in Art and Writing*, 1943; G. H. Mair, *English Literature: Modern, 1450–1939*, 1944; W. J. Entwistle and E. Gillett, *The Literature of England, A.D. 500*, 1946; R. Church, *British Authors*, 1918; A. Comfort, *The Novel and Our Time*, 1948; L. A. G. Strong and Monica Redlich, *Life in English Literature*, 1949.

English Review. The, was started by John Murray, the celebrated publisher. It first appeared as an annual register, entitled *The London Mercury*. A 2s. 6d. review of the same name was founded by Chapman & Hall in 1908. Noteworthy for its high literary qualities, and devoted itself to the pub. of such articles, essays, belles lettres, short stories, and poems, by whomsoever written, as it deems remarkable for intrinsic merit. Many an obscure or struggling writer has sprung into fame through the medium of its pages.

English River, estuary on Delagoa Bay in S.E. Africa.

English River, see CHURCHILL RIVER.

Englishry, term used during the Norman rule in England. It was used to show contempt, for if the hundred could prove that a murdered person was English, that is to say, make a 'presentment of E.' it escaped without punishment. This was abolished in the first half of the fourteenth century.

English Setter, see SETTER.

Engraving, primarily the art of drawing on a substance by means of an incised line. The term was early applied to the work produced by that process and later to the impression of the engraved work upon a sheet of paper. This article deals with E. on metals. From very early times gems have been engraved with ornaments or signets, and commemorative inscriptions have been cut into metal tablets, but technically the word E. is confined to the incision of a design upon a plate of metal or a wooden block, for the purpose of producing upon paper by the aid of ink a series of reproductions of that design. Copper plate and steel E. was introduced at the end of the fifteenth century. On metals, E. are usually in intaglio, that is, the lines are sunk in and possess a positive value in that they actually trace the design. In woodcuts and wood-engraving (q.v.) the lines are negative, their object being to leave the true design projecting in relief. Copper and steel are the favourite metals of engravers, but zinc, brass, silver, and iron have also been employed. Steel is much harder to work with than copper, but on the other hand its very toughness makes it possible to take off a greater number of good impressions. By means of electrolysis, it is now possible for the engraver to protect his copper plate by a thin coating of steel; the result of this has been almost to do away with steel plates altogether. Copper has always been preferred where the aim of the artist is to produce a highly finished and delicate reproduction of the design.

Line Engraving.—Implies the use of a tool called the graver or burin. This con-

sists of a steel rod some 4 in. long, with a square or lozenge-shaped section, a sharp edge being secured by cutting the section obliquely. The engraver controls the rod by grasping a wooden handle, and in making his strokes varies the pressure in accordance with the thickness of the line desired. When his work is finished he covers the plate with printer's ink, presses it into the incisions by the aid of a dabber, rubs away the superfluous ink with a piece of muslin and then carefully lays a sheet of moistened paper on the engraved surface. The plate, with the paper thus attached, is placed on a board which slides between two rollers in what is called the copperplate press, blankets softening the contact of paper and roller. The



AN ENGRAVING BY DURER:
'Christ on the Cross'

design is reproduced by the transference of the ink from plate to paper. *Etching* (q.v.) involves the use of a mordant to eat into the plate. An etching-ground is spread over the copper surface and the lines are opened up with an etching needle.

Dry-point is a method of E. akin to the processes already described. The implement used is a steel point stronger and more tapering than the etching needle. When this is firmly drawn across the metal surface, quite a distinct burr—like a miniature thorn—is produced, the effect of which is to leave a semi-luminous ridge of tone at the side of each line, and thus to impart to the whole print an attractive richness of tone. Skilful engravers often blend these three processes in the one plate.

Tone-processes aim at achieving a result on the plate similar to that produced by a colour wash in painting. If the artist

uses the 'crayon or chalk-manner,' he first perforates his etching-ground with special needles like the mace-head or roulette, his aim being to suggest the rough texture of crayon strokes. If he follows the 'stipple method,' he imitates broad tone surfaces by covering the etching-ground with dots and short strokes, using the curved stipple engraver, the dry-point, or the roulette for the purpose. The essential distinction of the *mezzotint* process is that the craftsman begins with a dark ground and proceeds to create his lights by a negative and scraping device. With the assistance of a kind of chisel, called the 'cradle' or 'rocker,' he roughens the plate by raising metal points or burrs. At this stage the copper would print a rich black, but the mezzotinter removes the burrs with his 'scraper' in proportion to the tone he wishes to produce. Thus, if he scrapes down to the bottom of the indentation, he will get a smooth surface, which will not be able to hold any ink and will therefore print white. For *aquatints* the plate is prepared for E. by a porous coating of sand or resinous gum. This method produces Es. not unlike mezzotints.

Not more than twenty-five good mezzotints or dry-points can be obtained from one plate, as the brilliancy of the impression depends on the delicacy of the burr. A steel facing, however, increases the number to a hundred, whilst with this protection as many as three thousand line Es. may safely be taken off. The value of a print depends on the engraver and the fineness of the impression, which decreases, naturally, with the number taken. 'Artist's proofs' are treasured, as they bear the signature of the painter or engraver, or of both. The signature is considered a guarantee of the quality of the print and may imply retouchings by the artist.

History of line-engraving and etching.—*Line-engraving*.—E. is an art of comparatively recent development and the earliest known illustration, with metal as the medium, is the 'Flagellation,' which is dated 1446, and is the work of a Ger. who lived in the neighbourhood of Cologne or Basle. In Italy the art grew side by side with painting, and arose, as some think, from that of niello, which was a process of incising a pattern on gold or silver and then filling in the groove with a black compound (nigellum). The work of Maso Finiguerra (1426-61), with its plentiful cross hatchings illustrates the 'Fine Manner,' whilst that remarkably fine achievement of the Florentine Antonio Pollaiuolo (1429-98), 'The Battle of the Nudes,' exhibits the broad and simple lines of parallel shading which characterises the exponents of the so-called 'Broad Manner.' Somewhat similar in style is 'The Virgin and Child' of Andrea Mantegna (1431-1506). Albrecht Dürer, the Ger. (1471-1528), Marcantonio Raimondi, the Bolognese (1475-1530), and Lucas van Leyden, the Netherlander (1494-1533), form a conspicuous triumvirate of engravers. Formal dignity, refinement of touch, and unremitting care are a few of

the merits of Dürer's portrait of Albrecht of Brandenburg and his 'St. Jerome in the Wilderness.' Marcantonio is famous for his reproductions of Raphael's work. According to Vasari it was the engraver's magnificent 'Death of Lucretia' which was responsible for his long association with that painter. Lucas's skill may well be studied in his 'David playing before Saul.' The first French engraver of note was Jean Duvert (1485-1561), whose 'Apocalypse' series emphasises his mysticism and at the same time his somewhat heavy, overloaded style. In England the same distinction must be reserved for Wm. Rogers (fl. 1580-1610), who executed sev. portraits of Queen Elizabeth, all of which, however, are stiff and too ornate. Professional print-sellers, ready to provide portraits for historians and maps for discoverers, first began to flourish in the latter half of the sixteenth century. The pioneers were mostly Netherlanders, like Hieronymus Cock and Philippe Galle (1551-1612), many of whom migrated to Italy and Germany and thus popularised commercial En. abroad. Robert Nanteuil (1623-78), who was engraver at the court of Louis XIV., stands easily at the head of all Fr. engravers of portraits, and a similar honour among his own countrymen is with justice claimed for Wm. Faithorne (1656-91). Faithorne was the first great master of line engraving and raised E. to its place in art in England, equal to any work being done on the Continent. To quote his own words: 'The result of air, the symmetry of parts, the exact harmony of proportions, of lights and shadows, may be performed to the height in Graving.' Wm. Sherwen was initiated in the art of mezzotint E. by Prince Rupert and a dated mezzotint portrait of Charles II. (1669) establishes him as the first Eng. man to practise the art. John Smith (b. 1652) was a master of his period. He engraved over 100 portraits by Sir Godfrey Kneller and he also engraved after Correggio and Titians. John Faber who was born in Holland (1695), the son of a mezzotint engraver, engraved hundreds of plates after contemporary artists from Kneller and Reynolds to Hogarth and Franz Hals. Among the more notable of Eng. line-engravers were: George Vertue (1684-1756), engraver of portrait plates, appointed engraver to the Society of Antiquaries, and buried in Westminster Abbey; Wm. Hogarth (q.v.); Ravenet, who came from France in 1750, and blended line-engraving and etching; John Hall (1739-97), historical engraver to the king, one of whose works is 'Oliver Cromwell dissolving the Long Parliament'. François Vivares, the first landscape engraver in England and founder of a school of engravers in line; Lupton Goff (1791-1873), mezzotint engraver, estab. the use of steel for copper; Sir Robert Strange (q.v.) who pub. (1757) the famous plates 'Cæsar repudiating Pompeia', 'Romulus and Remus' after Cortona, and 'Charles I.'s Three Children' after Van Dyck and whose masterpiece 'Charles I.', also after Van Dyck, confirmed his European repu-

tation as an engraver of genius; Wm. Woollett (1735-85), who engraved in line and etching, his best plates being landscapes after Claude Lorraine and Richard Wilson, but the most famous of his works are the 'Death of General Wolfe' and 'The Battle of La Hogue' after Benjamin West; and Wm. Sharp (b. 1749) the last of the great copper-plate engravers, who executed many fine portraits after Reynolds and Romney and historical subjects. Wm. Blake (1757-1827) was also an engraver of merit in this period. There is true inspiration in his 'Illustrations of the Book of Job,' which have been rarely surpassed in purity of line, harmony of composition and independence of convention, whether in design or execution.



AN ENGRAVING BY BLAKE

'And my Servant Job shall pray for you'

At the end of the eighteenth century line-engraving was in its decline. Etchings and heliogravures have quite superseded line-engravings, and the burin will evidently soon be a tool of very subsidiary importance. Wood-engraving, on the other hand, has seen a strong revival. John Thompson (1785) a pupil of Branstrop and the best of all the wood-engravers of the period, also engraved for the Bank of England and executed the vignette of Britannia used on bank notes. Timothy Cole became known in America as a wood engraver of the works of old It. masters; and James Whistler (q.v.) the famous painter was also one of the distinguished Amer. etchers. Present day engravers of note include: Macnab, Alison McKenzie, Percy Bliss, Stephen Gooden and Gortulde Hermes. See also ETCHING; MEZZOTINT; NIELLO WORK; PHOTOGRAPHY.

PROCESS WORK ; WOODCUTS. See M. C. Salaman, *Old Engravers of England*, 1906 (with bibliography); *Bryan's Dictionary of Painters and Engravers*, 1930.

Engrossing, term applied to the practice of buying up any commodity in such large quantities that the buyer then commands the market. It was practically the same sort of system as forestalling, which meant buying cheap to sell at a much larger price. Under the old laws these practices and all others like them were considered as crimes and contrary to justice, and were forbidden by the statutes of the land. But in 1844 all the laws with regard to these practices were finally abolished, and they are now considered quite legal—a fact which is proved by the modern system of forming 'trusts.'

Enharmonic, term in music applied to modulations made merely by changes of sharps to corresponding flats and vice versa, e.g., C \sharp to D \flat , E \sharp to F \flat , etc. On the piano or other keyboard instrument there is no change in sound, but on string or wind instruments there is a minute difference, discernible to the trained ear.

Enid, city of Oklahoma, U.S.A., with an air-port. The leading grain mkt. of the state, and the trade centre for a large agric. dist. and for gas and oil fields. It is an important railway junction, has railroad shops, oil refineries, flour mills, and meat-packing plants, and makes agric. implements and wire. Pop. 28,000.

Enkhuizen, one of the dead cities of the IJssel Meer (Zuider Zee), Holland, and a delight to every visitor. The great Dromedaris Tower (1510), a splendid relic of the old fortifications, stands guardian over a curious little harbour. It takes an hour to walk round the tn., but its once busy streets are now gardens and its former pop. of 40,000 has fallen to about 8000. There are many interesting buildings, the chief being the belfry of 1542, called the *Zuidertoren*, and the orphanage or *Weeshuis* (1619). The herring fishery was the great wealth of E., but now not one of the 400 smacks remains. Paul Potter (1625-54), the Dutch painter, was born here.

Enlistment, method by which the army is recruited in such countries as do not have a form of conscription. Most of the European countries have some form of conscription, but in the case of Great Britain and America E. traditionally takes its place, though it would seem not improbable that conscription, which was re-introduced in Britain in 1939, will eventually replace voluntary enlistment permanently. Up to the beginning of the eighteenth century E. took place through an official who had no definite recognition by the army authorities, but who received a commission for every recruit. The period of service for which a soldier enlisted was not determined, in fact he served as long as he was physically fit. At the beginning of the nineteenth century recruiting was taken over by the army authorities, and since that time many changes have been made. A man on enlisting nowadays must make declaration

before a magistrate or before the commanding officer. He then takes the oath, signs a declaration, and is then, and only then, held to have enlisted. Punishment for false declarations can be made either in a civil court or by means of a dist. court-martial. A soldier is at liberty to purchase a discharge under certain conditions, but never when the country is at war. In ordinary peace-time engagements in recent years soldiers enlisted for twelve years, seven with the colours and five with the reserve, but many alterations were made in this system soon after the end of the First World War, e.g. in the Artillery, E. was for six years with the colours and six with the reserve. Further, it was possible to re-enlist at the end of twelve years' service and do twenty-one, after which a soldier became entitled to a pension (or after eighteen years' service if discharged on medical grounds after completing that period). The Special Reserve enlisted under special terms, usually for six years, with the possibility of doing more later if they so desired.

Enna, see CASTROGIOVANNI.

Ennis: (1) Tn. in co. Clare, Ire. It is the co. tn., and is situated on the Fergus about 20 m. N.W. of Limerick. In the tn. are the remains of a Franciscan friary, and also a Rom. Catholic church and college, while close by is a racecourse. The port is Clare Castle. Pop. 6000. (2) Tn. in Ellis co., Texas, U.S.A. It lies to the S.E. of Dallas, with cotton gins and compresses and cotton seed oil mills. Pop. 7000.

Enniscorthy, tn. of co. Wexford, Ire., situated on the Slaney, about 14 m. N.W. of Wexford. It has a beautiful situation, the land around being very fertile. Below E. the riv. is navigable for barges. The castle, now partially destroyed, is an interesting old building. Pop. 5500.

Enniskillen, co. tn. of Fermanagh, Northern Ireland, 116 m. from Dublin and 88 m. from Belfast on the G.N. (Ireland) Railway. Situated on an is. between Upper and Lower Lough Erne, with suburbs on both sides. It has an agric. trade and its secondary industries are the manuf. of cutlery and tanning. E. was granted its first charter in the seventeenth century, and was a noted Protestant centre in the time of Wm. III. It gave its name to two regiments of the Brit. Army: the 28th Foot, known as the Royal Inniskilling Fusiliers (q.v.) and the Royal Inniskilling Dragoons. In 1921 the latter regiment was disbanded and its name transferred to the 5th Dragoon Guards. Pop. 4900.

Ennistimon, tn. of co. Clare, prov. of Munster, Ire. Pop. 1200.

Ennius, Quintus (c. 239-c. 169 B.C.), one of the first Rom. poets, was b. at Rudiae in Calabria. Although little is known of his hist., he seems at first to have pursued a military career. At about the age of thirty-eight he became acquainted with M. Porcius Cato and accompanied him to Rome. From that time he seems to have lived chiefly at Rome, and was successful in obtaining Rom. citizenship, a thing

which a foreigner very rarely did. He was a man of great learning, having a good knowledge of Gk. as well as Lat., so that he was able to earn his living as a tutor. He was buried in the Scipios' tomb and his monument placed among those of that family. Of his works, which it is believed existed as a whole until the thirteenth century, only fragments now remain, among them being dramas, satires, and annals. See E. Stuart's ed. of *Annals*, 1925.

Enns: (1) Tn. of Upper Austria, standing on the riv. of the same name, about 10 m. S.E. of Linz, with a museum and local Rom. antiquities. Pop. 4200. (2) Riv. of Austria which rises S. of Radstadt, and flows into the Danube. Chief trib. is the Steier.

Enoch (Heb. *Hanôkh*), name of four persons in the Bible: (1) A son of Cain (Gen. iv. 17); (2) a grandson of Abraham (Gen. xxv. 4); (3) a son of Reuben (Gen. xlv. 9); (4) the son of Jared and grandson of Enoch (1), with whom he has probably been confused. In Gen. v. 18-24 we read that after a life of 365 years this E., who 'walked with God,' was translated—he was not, for God took him. The number 365 hints at certain connections between the Heb. tradition and a Babylonian sun-god. Later Jewish legend makes E. the inventor of writing, arithmetic, and astronomy, and the apocalyptic books described below were ascribed to him. Among the Arabians he is known as *Idris* (the learned one). The 'St. Enoch' of Glasgow is a corruption of St. Thénaw, the mother of St. Kentigern.

Enoch, The Book of, apocalyptic work belonging to the two centuries immediately preceding the Christian era, which purports to give an account of the revelations made, both before and after his translation, to the Enoch 'who walked with God.' It gives a hist. of the introduction of sin into the world and the fall of the angels. It describes the deluge which followed on the intercourse of the fallen angels and the human race, the course of the world after that time until the period of the Messianic kingdom, and the final judgment. It also gives some explanation of astronomy, the seasons and the secrets of nature in general. The B. of E. was originally written in Heb., in the Palestinian region, and was then trans. into Gk. It was well known to the early Christians, by many of whom it was held in high esteem. St. Jude in his general epistle quotes from Enoch in v. 14. The work was lost sight of about the seventh century, and only quotations could be obtained until 1773, when James Bruce, the traveller, brought back from Abyssinia two Ethiopic copies of it, which proved to have been made from the Gk. version. A trans. was pub. by Archbishop Lawrence in 1821, and the Ethiopic text followed in 1838. The B. of E. is held to be of composite origin, and Prof. Charles divides and dates it thus: (1) ch. i.-xxxvi. before 170 B.C.; (2) ch. lxxviii.-xc. a few years later; (3) ch. xci-civ. between 134 and 95 B.C.; (4) ch. xxxvii.-lxx. between 94 and 64 B.C. The rest of the work consists chiefly of quotations

from a lost Book of Noah, etc. The Book of the Secrets of Enoch (*q.v.*), is a similar mystical work. See R. H. Charles, *Book of Enoch*, 1893.

Enoch, The Book of the Secrets of, has been also called 'the Slavonic Enoch,' because the MSS. of it, which have only recently been discovered, are in that language. It seems, however, to have been originally written in Gk. during the course of the first century A.D., and also to have been composed in Egypt. This book, which is entirely independent of the Book of Enoch—sometimes known as the 'Ethiopic Enoch'—gives an account of the way in which Enoch was taken up into the heavens, seven in number, and of his visions there, followed by an account of his subsequent experiences. See R. H. Charles (ed.), *The Book of the Secrets of Enoch* (trans. by W. R. Morfill).

Enos, seaport of Greece, situated on the Maritsa. It is impossible for any but small vessels to enter the harbour owing to the silting of sand. Pop. 7000.

Enschede, tn. of Holland in the prov. of Overijssel. It is one of the prin. centres of the cotton industry and has parks, a people's univ. and industrial museum. Pop. 87,470.

Ensete, Abyssinian banana. *Musa ensete*, which has the largest leaf on any known land plant, the size being as much as 17 ft. by 3 ft. The flower-stem is eaten by natives, but the fruit is not edible. The plant is cultivated in tubs as a decorative plant in sub-tropical horticulture.

Ense, Karl August Varnhagen von, see VARNHAGEN.

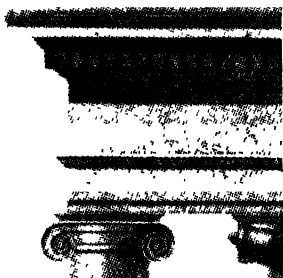
Ensign: (1) Originally the name applied to the lowest rank of commissioned officer in the Brit. army. He obtained this name from the fact that it was his duty to carry the colours or ensign, but after the custom died out, the title was changed in 1871 to that of second lieutenant. (2) The national flag used on board ship, which flies from the pole known as the E. staff. The red, white, and blue Es. which are in use now date from some time back, but their present use differs slightly from the former. The red E. is used for merchant vessels. Ships of the Royal Navy fly the white E., and so does the Royal Yacht Squadron, while the Naval Reserve, in common with certain yacht clubs, flies the blue E. The present system dates from 1864. Until that year, the Navy bore three different Es.; but after that year the divs. of Flag officers into those of the red, white and blue squadrons was discontinued and the White E., with its broad and narrow pennants (or pennants) was estab. as the colours of the Royal Naval Service, the use of the red and blue colours being reserved for special occasions.

Ensilage, see HAY and ENSILAGE.

Ensisal, textile manufacturing com. in the prov. of Liège, Belgium. It stands on the Vesdre, N. of Spa. Pop. 6700.

Enstatite, silicate of magnesium, is translucent and white in colour, or sometimes has a greenish hue. It has been found in Moravia, Prussia, and other parts of Europe.

Entablature (Lat. *in*, and *tabula*, a tablet), the architectural term for the crowning part of a structure, carried by the columns in the classic orders. It usually consists of three distinct sections: the architrave, resting directly on the columns; the frieze, the decorative member; and the cornice, the projecting and protective member. There are, in all, seven forms: the Gk. Doric, the Rom. Doric, the Tuscan, the Gk. Ionic, the Rom. Ionic, the Corinthian, and the Composite, the last two being entirely Rom. The simplest, but also the highest in proportion, of these was the Gk. Doric. The group of three members which the term E. designates was original and constant in Gk. architecture, and was derived from



ENTABLATURE (IONIC)

the methods of construction. In certain countries, such as in Provence (France) and Italy (Rome, prov.), where classic forms survived or were imitated, the E. lasted during the Middle Ages. Occasionally the decorative member, i.e. the frieze, is omitted. In all probability it did not exist in the archaic temple of Diana at Ephesus, neither is it found in the Lycian tombs. It is easier to find examples in which the medieval artists reproduced separate parts of the E. than where the entire group was used.

Entail. An entailed estate or estate tail is an estate of inheritance in land settled on sev. persons successively in a strict line of devolution, such persons being exclusively the heirs male or female of the grantee or grantees. The word E. is derived from Fr. *tailler*, 'to cut,' because the succession to the estate was cut down to the grantee for his life and then to his issue. Estates tail are either *general*, i.e. are granted 'to A and the heirs of his body' without restriction as to sex or maternity; or *special*, i.e. restricted in one or other of the above ways, e.g. 'to A and the heirs male of his body,' or 'to A and the heirs female of his body,' or 'to A and the heirs of his body by his wife B.' The hist. of the development of estates tail may be said to be intimately bound up with the traditions and associations of co. families; the whole object of their legal creation being to tie up property in strict

family settlements so as to ensure that the estates should devolve from father to son for ever. The old common law judges always construed a gift 'to A and the heirs of his body' as a gift of the full disposable estate of inheritance or fee simple (*q.v.*) (see also DE DONIS), conditional on issue actually being born to A. Consequently when issue was born A could sell the estate and bar his own issue. Though it is now theoretically impossible to tie up lands in a family for ever, and though the tenant-in-tail can bar the rights of everyone by executing and enrolling a *disentailing deed* within six months of obtaining possession, the custom is for the eldest son of the grantee, on coming of age, to execute a deed with the consent of his father barring the E., and for the father and son then to enter into a deed of re-settlement by which they re-settle the land on the father for life, with *remainder* to the son for life, and then after the death of the son, to the son's eldest son in tail; this process being repeated every time an eldest son reaches twenty-one. The efficacy of this compromise in thus preserving the posthumous pride of ancestors depends entirely on the continuous desire of each father to tie up the lands in the family and on the continuous obedience of each eldest son on attaining twenty-one. If, however, the son prove disobedient, the father can, in theory, deprive him of all income while he (the father) remains alive, and so it comes about that the son generally abstained from his right to bar his own issue (which he can do without the consent of his father) and 'surrendered his birthright for a financial mess of pottage.' In this connection must be noticed the meaning of the term 'protector of the settlement.' A protector is a statutory creation, and denotes the tenant of the first life estate under the deed creating the E. (usually, of course, the eldest surviving ancestor), or some person or persons appointed by the deed itself to act as protectors. The existence of the 'protector' prevents a tenant-in-tail *not yet in possession* from barring the *whole* E. unless he obtains the consent of such protector, though, as seen above, he may bar his own issue. In modern times the system of E. has, by a succession of Acts of Parliament (particularly the Cairns Act, 1882, and the Law of Property Act, 1925) been greatly modified, and greater powers given to the actual owner of alienating the estates to which he has succeeded, a process which is called 'breaking the entail.'

Entebbe, administrative centre of the Uganda Protectorate, Brit. E. Africa, on the N.W. of Lake Victoria, with charming views over the is.-studded lake. There are Botanical Gardens and a cotton ginny, and cotton, cocoa, rubber, etc., are grown in the dist. The sleeping sickness has entirely disappeared. Many gov. depts. are located at the township of E., including the headquarters of the Agric. Dept., the Dept. of the Conservator of Forests, the Game Warden's Dept., Geological Dept. (with laboratory and museum), Land Survey and Mines Dept., Public Works Dept., Printing Dept., and

headquarters of the Treasury. The headquarters of the Commission appointed by the League of Nations for the study of tropical diseases is here, as also the new European Hospital, Gov. House and Court House. E. is a regular port of call for aircraft between England and South Africa. There is a seaplane alighting area at E. and a wireless station, used mainly for the aeroplane and meteorological services. Area (dist.) 2446 sq. m. (land and swamp 1980, open water 466). Pop. (dist.) (1931 census), 186,600 (natives 182,200, Indians 780, Europeans, 275).

Entellus Monkey, or Hanuman, the *Semnopithecus Entellus* of India. Its body is from 2 to 4 ft. long, and the non-prehensile tail is longer than the body. The general colour is a dirty yellow, but the full whiskers and beard are greyish-white. In character it is mischievous, noisy, and quarrelsome.

Entente Cordiale (lit. means 'cordial understanding'), term applied to friendly relations existing between Powers, most often used of the friendship between Great Britain and France that began early in the twentieth century and resulted in the alliance that carried on the First World War.

Enteralgia, see COLIC.

Enteric Fever, name given to a fever which mainly affects the intestines. It is also known as *typhoid fever*, and on the Continent as *abdominal typhus*. Typhus was a name formerly used to designate both typhus and typhoid. Whereas typhus is a virus disease, transmitted by the body louse, typhoid is due to a bacterium (*Bacillus typhosus*) which causes characteristic changes in the bowel, a different rash, and is water-born, from defective sanitary arrangements. The explanation of the methods of contamination of the water supply is one of the most complicated questions of sanitation, and the experience learned from every epidemic must be brought to bear to prevent a similar incident in other localities, where the water supply is apparently free from contamination. The period of incubation, or latency, of E. F. varies considerably in accordance with the number of bacilli swallowed. Consequently, it is often extremely difficult to trace the source and cause of contamination. Many people may have been infected and have travelled to distant parts before symptoms of the disease show themselves. Thus, epidemics may be very widespread, and isolated cases may occur far removed from their original source, and may themselves be the centre of fresh epidemics. The ravages of this disease emphasise the importance of a pure water supply for communities, and of proper sanitary arrangements in every house: of efficient drainage, and sanitary supervision of milk and other articles of food. The disease is recognised by symptoms seen at the patient's bedside, and by blood examinations (*Vidal's test*) in the laboratory. Anti-typhoid vaccination yields good results in preventing the disease and rendering its attacks less virulent and dangerous. In the tropics the germ may

be dust- or wind-born, and in hot climates the disease is more difficult of recognition where malaria is prevalent, as patients frequently suffer from both malaria and typhoid. House flies are also responsible for spreading the disease. E. F. mainly affects the small intestines, causing ulceration, and may lead to hæmorrhage and to perforation, even in mild cases when patients in apparent health are able to walk about. These cases, known as *ambulatory typhoid*, may suddenly without warning have perforation, which in the majority of cases is fatal. So that all cases of suspected typhoid should be put on starvation diet, as even a morsel of bread may bring about the catastrophe, to the lasting regret of well-meaning friends. Relapses are by no means infrequent: it would seem as if the immunity of the patients becomes exhausted after, say, one or two weeks, starting from the commencement of the disease, and then apparently the patients reinfect themselves and have a return of all their symptoms. In addition to typhoid being sometimes a mild affection and sometimes extremely severe, convalescence is usually prolonged, and patients who have apparently recovered may be infective for a period of years. These are known as 'typhoid carriers,' and may contaminate water supplies over wide areas or in different localities. Their detection is extremely difficult and in unsuspected cases the source is ascertained only by searching for them with extreme diligence, when suspected typhoid carriers can be proved by examination of the blood. Paratyphoid fever is similar to typhoid, but of shorter duration: there are two varieties, 'A' and 'B.' The vaccine 'T.A.B.' is prepared from bacteria of all three fevers.

Enteritis, inflammation of the intestine, i.e. of the small intestine. This is practically another name for diarrhoea, which in an ordinary case is the only symptom. In acute cases pain is usual, and is generally worse some little time after food has been taken. The appetite is either lost or capricious; the tongue is coated, and sometimes the abdomen may be inflated and gurgling sounds heard. In a cold climate, the condition, as a rule, passes in a week or so, but when there is some underlying cause beyond errors of diet, as in cases of tuberculosis or advanced liver or kidney disease, the condition may become chronic. In the tropics, the disease may exist for years, requiring for its cure removal to a cold climate. *Prevention* consists in the avoidance of those articles of diet which experience has shown disagree. With regard to wearing a belt (abdominal binder), that must be left to individual judgment and discretion, as so much depends on the muscular vigour of the patient and the kind of life that is led. *Treatment*—Nothing relieves pain more satisfactorily, and terminates diarrhoea better, than a teaspoonful of castor oil every two hours, until the solid contents are removed. If there is pain, five drops of laudanum can be added to each dose. Relief is also obtained by fomentations and other forms of heat. In no condition is

confinement to bed so beneficial. The diet should consist of boiled milk, barley water, yolk of egg and water, and rice water, the choice depending on the circumstances of the locality. The diarrhoea of children is often due to warmth; sometimes in cold weather from excessive clothing, and in warm weather to natural heat and the position of the cradle or cot near the floor. Much benefit results from tepid baths, or sponging with tepid water. In artificially fed children, unsuitable milk diet may maintain the condition. In addition to milk, the diet should contain similar articles to that of adults and after a time beef tea, jelly, or other meat preparations may be added. Contamination of food by house-flies is a very common cause of summer diarrhoea in children. It must always be borne in mind that diarrhoea is frequently merely the symptom of some other disease, such as cholera, dysentery, or typhoid, which call for their own lines of treatment; tuberculosis of the intestine is yet another possibility. For E. in horses, see under HORSES (DISEASES).

Entertainments Duty. This duty which was introduced in 1916 is charged on payments for admission to any entertainment, the only exemptions allowed being in cases of schools, educational and scientific institutions, and charitable purposes. There is no duty when the payment for admission (exclusive of duty) is not over 6d. The present rate is 1½d. where the payment does not exceed 7½d.; 2d. where it does not exceed 10d.; 2½d. where it does not exceed 1s. ½d.; 3d. where it does not exceed 1s. 3d.; where it exceeds 1s. 3d., the rate is 3d. for the first 1s. 3d., and 1d. for every 5d. or part of 5d. over 1s. 3d. Where all performers, whose words or actions constitute the entertainment are present and performing and the entertainment consists solely of a stage play, a ballet, a performance of music, a lecture, or recitation, a music hall or other variety entertainment, a circus or travelling show, the following rates obtain: Where payment of admission does not exceed 8½d., the rate is ½d., where it does not exceed 11d., 1s. 1½d., 1s. 4d., 1s. 6½d., 1s. 9d., the rates are 1d., 1½d., 2d., 2½d. and 3d. respectively; and where payment exceeds 1s. 9d., the rate is 3d. for the first 1s. 9d., and 1d. for every 5d. or part of 5d. over 1s. 9d. Certain exemptions are allowed to schools and educational institutions. The yield from the duty in 1935 was £9,724,280; in 1936, £7,806,080; in 1937, £7,572,280; in 1938, £7,985,000.

Entomology (Gk. *έντομα*, insects, *λόγος*, a discourse), the science that treats of insects. The term is often loosely used to include the study of other small animals, such as centipedes and spiders. The science began with Aristotle, who differentiated a class of animals, *éntoma*, and included in it the true insects, arachnids (spiders, scorpions, etc.), and myriapods (centipedes and millipedes). His grouping was followed for 2000 years. Modern E. has sev. branches, the chief being: (1) classification; (2) anatomy and physiology; (3) bionomics, or the

study of habits and life-hist.; (4) embryology, or the study of development; (5) cytology, or the study of cells; (6) ecology, i.e., the relation to the habitat; (7) paleoentomology, or the study of fossil insects. It had its beginning in the splendid work done in the seventeenth and eighteenth centuries. Mention must be made of Malpighi's work on the silk-worm (1669), Swammerdam's *Biblia naturæ*, in which he showed the true nature of the larva of an insect, and of Redi, the It., who disproved the theory of the spontaneous generation of maggots. At the same time John Ray was working on the classification of insects, and was the first to reach the modern lines of arrangement. In 1735 Linnaeus, working on the lines laid down by Ray, made a new classification of insects, which is the foundation of all modern work. The work of classification has been carried on by workers of all nationalities, and is now very complex and accurate. The anatomical work of Malpighi and Swammerdam has had many followers, the field becoming so large that workers at the present time have to specialise very strictly. The most famous work is perhaps that of Lavigny, who established the homology of the jaws of all insects in 1816, showing that in every species the mouth parts consisted of three pairs of jaws, more or less modified, namely mandibles, first maxillæ and second maxillæ (the last pair fused to form the labium or lip). Amongst Eng. workers in insect bionomics should be mentioned W. Kirby, W. Spence, Lord Avebury, and Miall. Much useful work was done by the Amer. C. U. Riley on the habits of locusts and his victory over the Phylloxera insect. The embryology, cytology, and ecology of insects and paleoentomology are essentially products of the last century, but already great strides have been made in these branches. Most of the recent embryological work has been done in Germany and the U.S.A. Brit., colonial, and Amer. entomologists have made considerable contributions to entomological cytology and ecology. Recognition of the economic importance of insects with regard to diseases of plants and animals has led to the appointment of gov. entomologists in the U.S.A., Canada, and Great Britain, and applied E. has made rapid progress during the present century.

As a result of the researches of many workers, notably Emin Pasha, Grassi, Laveran, Manson and Ross, the mosquito was recognised in 1898 as a carrier of the malaria parasite. Subsequently mosquitoes have been proved to carry organisms causing elephantiasis, yellow fever, and Dengue fever. The most effective method of extermination is to render uninhabitable the swamps which form the breeding-places of the insect. In England, extensive work on mosquito control is being carried out at Hayling Is.

House-flies are other active agents in spreading disease. In feeding on refuse, they collect on their mouth parts and legs organisms which they deposit, when walking or feeding, on the food of man.

In addition to various bacteria causing tuberculosis, typhoid fever and other diseases, flies may carry eggs of the hood-worm and of other worras parasitic in man. The gad-fly and tsetse fly transmit disease directly to horses and cattle.

The irritation and disease caused by flies to the troops in the First World War stimulated efforts to exterminate these pests. The methods used include the exclusion of air from the eggs by closely trapping the larvae; the addition of borax or of powdered hellebore to the breeding-grounds; and the preventive measure of the immediate destruction of all refuse. In America, Africa, and Asia investigations are being made on the habits of insects injurious to cotton and tobacco plants, fruit trees, and forest trees of economic value. In many cases, spraying with appropriate solutions, or the introduction into the dist. of an animal which preys on the insect pest, is beneficial. Good results have recently been obtained with new insecticides, notably 'D.D.T.' and 'gammexane.' In the Second World War the battle dress worn by Brit. troops was impregnated with D.D.T. as a protection against body lice, and similar methods enabled an outbreak of typhus amongst the civilian pop. of Italy to be brought quickly under control.

As a further instance showing how a knowledge of insect habits and ecology has enabled control to be effected, reference may be made to the locusts, which have been famous for hundreds of years as agents of destruction and which occur in over eighty countries of all five continents. There are eight or so species of locusts; in each of them (according to the theory first put forward in 1921 by Uvarov) there exist various phases. In the solitary phase the insect lives isolated as a short-horned grasshopper; if however a number of these solitary forms breed under crowded conditions, they develop into the gregarious phase, which is the true locust and which migrates in swarms. The two phases may differ widely in appearance as well as in habits, and between the two extremes are numerous intermediate phases. The attention of entomologists is directed to preventing the development of the gregarious phase, or to destroying it when detected before migration can take place. The 'hoppers' (immature individuals with rudimentary wings) can be dealt with by driving them into pits or trenches, or by the use of poison bait containing arsenic, sodium silicofluoride or 'gammexane'; the latter substance is particularly useful, since it is rapid in its action and does not harm cattle. Flame throwers and dusting from aeroplanes are also used. For destroying the adult winged individuals there is at present no effective method available. These activities are controlled and co-ordinated by the govts. of the countries concerned, and by the Anti-locust Research Centre estab. in 1930 at the Natural Hist. Museum in S. Kensington. Morgan and Bridges' work on the cytology and genetics of *Drosophila*, and Goldschmidt's investigations on the gypsy

moth, have led to new developments in the relation of cytology to genetics and to the problems of heredity.

Attention has also been directed to the problems of insect physiology, e.g., the mechanism of flight, the process of respiration, insect behaviour and the waking of the sense organs especially the compound eyes. It has been shown also that metamorphosis is initiated by a hormone produced in the head and transported by the blood stream to the organs concerned.

E., beyond all other sciences, affords an opportunity for the amateur worker. The Société Entomologique de France and the Royal Entomological Society of London admit professional and amateur members. The insects when collected are best killed by prussic acid in some form. When they are relaxed they must be set. *Setting* consists of pinning the insect on to cork, the body of the insect lying in a groove in the cork, the wings and other parts being arranged in the best possible manner by means of needles or *setting bristles*. Paper braces are then put on to keep the whole in position, and the insect is thoroughly dried. It is then ready to be put in the collection. See A. T. Gillander, *Forest Entomology*, 1912; J. H. Fabre, *The Life and Love of the Insect*, 1918; H. G. Reinald, *Applied Entomology*, 1921; A. Balochowsky and L. Mesnil, *Insectes nuisibles*, 1936; M. Burr, *The Insect Legion*, 1939; V. B. Wigglesworth, *The Principles of Insect Physiology*, 1939, 1942; R. Frost, *General Entomology*, 1942; A. D. Inuns, *General Textbook of Entomology*, 1923, and *Insect Natural History*, 1947. See also articles under industrial insects. For locusts see articles in *Endeavour*, 1943, ii., 56 and 1947, vi., 24. See also INSECTS.

Entomostraca (Gk. *ἐντομοστράκον*, insect, *στράκον*, shell), name given to a sub-class of Crustaceans, most of whose species are enclosed in a delicate, transparent, bivalve shell which can be opened or closed at the will of the animal. Many of them are very small, and are found in great numbers in stagnant, fresh, and salt water; some are parasitic. The E. comprise many thousand species which fall under four great orders, Phyllopoda or Branchiopoda (q.v.), Ostracoda, Copepoda, and Cirripedia (Barnacles).

Entophytes (Gk. *ἐντός*, within *φύτον*, plant), the term applied to certain plants, generally parasitic, which live inside other plants or inside animals. These are frequently harmless, but some have fatal results in animals, as is the case with many bacteria.

Entozoa, see **INTESTINA**; **PARASITES**.

Entrecasteaux, see **D'ENTRECASTEAUX**.

Entre-Douro-e-Minho, was originally a prov. of Portugal, its W. boundary being the Atlantic, with the R. Minho on the N. separating it from Spain, and the Douro on the S. The dist. is well cultivated and mountainous, and is also one of the most densely populated in Portugal. It is now divided into three parts: Viana do Castelo, Braga, and Porto. Area 2800 sq. m.; pop. 1,678,000.

Entremont, valley of Valais, Switzerland.
Entrenchment, general term applied to any earthwork which is thrown up to protect soldiers against an enemy. Es. may be made very hastily and simply, as in the case of the ordinary shelter trenches, or slit-trenches, or they may be of a much more complicated and permanent nature. In the case of the former the men are provided with implements so that they can easily and quickly dig up the earth to form a parapet behind which they can take shelter and over which they can fire. They are also so constructed that they do not form any obstruction to the artillery who may want to drive over the ground. *See further under FORTIFICATION.—Field Fortification.*

Entre Rios, prov. of the Argentine Republic, lying between the two rivs. Parana and Uruguay. Some parts of this dist. are low-lying and marshy, but others are well-watered and fertile, so that the inhabs. are chiefly engaged in cattle-rearing and agric. pursuits. Large tracts of the country are also covered with forests. Cap., Paraná; pop. 776,300.

Entresol, in architecture, a low storey or part of a storey in a building, between two higher ones. The E. consists of a low apartment usually placed above the first floor; in London, frequently between the ground floor and the first floor. Also called the mezzanine floor.

Entropion, curving in of the eyelids, the opposite of ectropion. It causes constant irritation by the eyelids coming in contact with the eye, with resulting interference with vision. One cause of E. is trachoma (a contagious eye disease), a condition which, in most countries, precludes the admission of immigrants.

Entropy, *see under* THERMODYNAMICS.

Entry: (1) Taking possession by the legal owner of lands and tenements when another person is wrongfully in possession of them. Formerly E. could be effected by force, but as this self-redress led to great abuses, forcible entries were, by two Acts of Richard II., made punishable by fine and imprisonment. To establish forcible E. it must be proved that the E. was accompanied with some circumstances of actual violence or terror, as e.g. by the aid of unusual weapons, a considerable number of persons, or with menace to life. Mere violence without such exceptional circumstances would amount to no more than trespass, giving rise to an action for damages. It is to be noted, however, that where possession has been obtained by a trespasser (as distinct from the position of a person who was rightfully in possession in the first instance but who subsequently became technically a trespasser through some default) the rightful owner, according to one decision, may use reasonable force in ejecting him, and need not appeal to the law for assistance. The remedy for forcible E. is either by an action for damages, by indictment, or by an information before justices of the peace. A forcible E. by more than three persons acting in concert might amount to and be punishable as a riot (*q.v.*). The Conveyancing Act, 1881, gives to a person

entitled to any rent charge or other annual sum charged upon or payable out of land, power, if the sum or any part is unpaid for forty days after falling due, to enter into possession of the land and take the income of it until all the arrears due at the time of E. and incidental expenses are paid. If he cannot enter peaceably his appropriate remedy is by action of ejectment (which has taken the place of the old remedy by *writ of entry*) to try the question of title. A valid E. to give possession must be upon some part of the property claimed, and it is safer for the person entering formally to declare that he takes possession of the whole. (2) In leases: Formerly, E. was necessary to complete the tenancy, and till E. a tenant had no more than what was called an *interesse termini* (a right to have the land), which, however, was a transferable right, though it could be surrendered or released. But the doctrine of *interesse termini* was abolished by the Law of Property Act, 1925, and now all terms of years take effect from the commencement of the term without actual entry. E. is also not necessary to complete a freehold title. As to a sheriff's power of E. *see under* EXECUTION.

Enugu, tn. of S. Nigeria, situated 151 m. from Port Harcourt: it is the headquarters of the Chief Commissioner of the E. Prov. Notable as a coal-mining centre. The mine began to yield coal in 1915 and is owned and worked by the gov. It is capable of producing 400,000 tons a year, and supplies the railway both in Nigeria and the Gold Coast, and also ships that call at Port Harcourt.

Enver Pasha (1881–1922), Turkish politician and leader of the 'Young Turks,' b. at Constantinople. Early triumphed over Abdul Hamid (*q.v.*) in his agitation for the restoration of the Constitution of 1876, and was then sent to Berlin as military attaché. He was in command of an army corps in the Balkan War, 1913 (*q.v.*), and during the peace negotiations brought about the assassination of the War Minister, which office he then filled himself, and placed his adherents in the other important state offices, his purpose being to override any possibility of interference by the W. Powers. In the First World War he became the virtual ruler of Turkey so far as domestic affairs were concerned, but was a complete failure in war policy, being unable to win the confidence of the Ger. adviser, Gen. Liman von Sanders (*q.v.*). After the collapse of Turkey, he was condemned to death, but having already fled the country, the sentence was nugatory. Always treacherous, he then appeared in Turkestan in 1922, where a rising against the Bolsheviks was in progress, and purported to act as mediator. After being imprisoned by the insurgents, he came out as emir and their leader against the Soviet, but only to suffer a series of defeats. It is not improbable that he was trying to play into the hands of the Bolsheviks, and though the manner and date of his death are uncertain, it seems that he was killed at Duchamba Rajiwan in July

1922. See O. Liman von Sanders, *Fünf Jahre in der Türkei*, 1920.

Environment, term applied to all conditions which are not part of the individual self of a person, and which tend to alter each individual, thus forming certain varieties and species. The E. may be physical, including such things as geographical or chemical conditions, the latter including the state of the air, the conditions of food, and many other such influences. There is also a social E. showing the influence of one individual upon another. This leads also to the estab. of new customs and new institutions, thus bringing about a new type of individual. See also EVOLUTION.

Envoy, see DIPLOMATIC SERVICE; PLENIPOTENTIARY.

Enzelli, (Pahlavi), seaport tn. situated on the Caspian Sea in the prov. of Gililan, Persia. It is about 15 m. N.W. of Resht, and is the port of that tn. After the Russian revolution of 1917 the Entente Powers tried to organise unaffected elements in Armenia and Georgia, and with this object Maj.-Gen. L. C. Dunsterville (q.v.) was sent from Mesopotamia with a small force early in 1918. He reached E. only to find the place in the hands of the hostile Bolsheviks and the neighbourhood dominated by a band of organised brigands some thousands strong. He therefore withdrew and marched by another route to Baku. Pop. 3000.

Enzina, Juan del, see ENCINA.

Enzio (1224-72), king of Sardinia and natural son of Frederick II. About the year 1238 he married Adelasia, an heiress, and the title of King of Sardinia was conferred on him by his father, as well as that of vicar-imperial in Italy. In the year 1241 he was victorious over the Genoese fleet, taking prisoner sev. church dignitaries. He followed this success by others, but in 1249 was himself conquered and made a prisoner, spending the rest of his life in captivity at Bologna.

Enzymes, ferments present in the digestive juices which render food substances soluble and diffusible. This process is termed *digestion*, and consists essentially in changing colloid food substances into crystalloid bodies, as in the latter condition they can dissolve in the fluid contained in the alimentary canal, and then diffuse through the mucous coat into either the blood vessels or lymphatics, and so become available for utilisation. E. are probably colloid bodies themselves, and they act as *catalytic* agents and commence the change in the chemical nature

of the food substances. They perform this function in the presence of acids and alkali, but for each E. there is an *optimum temperature* at which the action is most vigorous, and there are high and low critical temps. at which the action ceases. It is remarkable that the many complicated food materials yield but few compounds after digestion; proteins are changed into peptones, tyrosin, and leucine by the E. (*pepsin* and *trypsin*) of the gastric glands and pancreas; the fats are changed into fatty acids and glycerine, or emulsified, and saponified by the *steapsin* of the pancreas; carbohydrates are changed into glucose with, or without intermediate states by the *Ptyalin* of the salivary glands, the *amyllopsin* of the pancreas and *invertase*, *maltase*, and *lactase* of the intestinal glands.

Eoanthropus Dawsoni, see PILTDOWN MAN.

Eocene, in geology, is the lowest of the three groups into which Lyell divided the Tertiary system. His classification, based on the relative percentages of recent species of mollusca contained, has been modified by Beyrich, who inserted the Oligocene group, to include strata formerly classed as Upper E. and partly Miocene. The E. and Oligocene are sometimes classed together as the Palaeogene or Older Tertiary. In W. Europe the E. follows the Cretaceous so abruptly as to suggest that a break existed between the Cretaceous and Tertiary periods. In Europe, and in America and New Zealand, the deposits merge into one another, and no sharp line can be drawn between Cretaceous and E. rocks. During E. and Oligocene times, the floor of the Cretaceous sea was upraised into low lands with lakes and estuaries. The colossal disturbances of the earth's crust, by means of which this upheaval occurred, continued throughout Tertiary time, great mt. chains such as the Alps and Himalayas being formed. The Brit. E. strata are confined to the S.E. of England, where they occupy two synclinal depressions in the chalk, viz. the London and Hampshire Basins. The deposits are marine and estuarine, consisting of clays, sands, and marls, and have been arranged in the sequence shown in the table below. Outside the typical area the E. rocks occur in patches. The deposits of Bovey Tracy in Devonshire have been referred by some geologists to the E., and by others to the Oligocene. In Antrim and the Inner Hebrides occurs a magnificent development of Tertiary volcanic rocks.

Upper Eocene	{	Upper Bagshot Sands
Middle Eocene		Middle Bagshot Sands Lower Bagshot Sands (upper part)
Lower Eocene	{	Lower Bagshot Sands (part)
		London Clay
		Oldhaven Beds
		Woolwich and Reading Bed
		Thanet Sands

LONDON BASIN

Barton Sands
Barton Clays
Bracklesham Series (including the Bournemouth Beds and the Alum Bay Beds)
Bognor Series (equivalent of London Clay)
Plastic Clays (similar to Woolwich and Reading Beds)

HAMPSHIRE BASIN

These consist of basaltic sheets traversed by numerous bands of gabbro and basalt dykes, the date of their emission being fixed by the discovery of intercalated leaf beds of the same age as the Bournemouth beds (see table).

Two great E. regions may be distinguished in the European area. The first, termed the Anglo-Gallic prov., includes the E. of the Eng. area, of N. France and of Belgium, and the similarity of the deposits points to the fact that this was one great tract of sedimentation. The second, the S. European or Alpine E. area, is much more extensive. It includes the whole of S. Europe, extends southwards into N. Africa, to the Sahara and Egypt, and stretches eastwards to the Himalayas, and through Java and Sumatra to the Philippines. There existed, then, over this great area, a huge sea (of which the Mediterranean is a remnant) connecting the Atlantic and Pacific Oceans, and out of which the Alps, the Pyrenees, and part of the Carpathians rose as is. In the waters of this sea, the 'Mittelmeer,' massive systems of limestone were formed by Nummulites, a genus of gigantic disk-shaped Foraminifera, which attained a great development in early E. time. The nummulitic formations of N. Africa and India are very rich in fossils, yielding large corals of the reef-building type, molluscs, and echinoderms. The problematical 'Flysch' of the Swiss Alps or 'Macigno' of the Maritime Alps probably represents the littoral deposits of the Older Tertiary period, and consists of thick grey sandstones and shales with scarcely any organic remains. The E. of the Libyan desert, as well as being remarkably fossiliferous, are of special interest, since they show a perfect petrographical and palaeontological passage from the Cretaceous into the Tertiary beds in question. In N. America the E. rocks are mainly of the fresh-water type. The marine deposits are represented by the Alabama beds, and occur in the valley of the Mississippi from the gulf of Mexico to beyond the mouth of the Ohio. On the Californian coast these marine E. rocks attain a thickness of 3000 ft. Over the Rocky Mt. region, from Mexico to Brit. Columbia, is found the lignite-bearing, fresh and brackish water formation known as the Laramie beds. Deposits of a similar type are found between the Rockies and the Wahsatch Mts., i.e. in the waste known as the bad lands. In the Rockies these beds attain a thickness of 13,000 ft., and have been subdivided into the following divisions: (1) Wahsatch group, (2) Green R. group, (3) Bridger group, and (4) Uinta group. These rocks are of great geological importance because of their extraordinary richness in vertebrate and mammalian remains. The mammals suddenly developed during E. time, and are chiefly of the placental group, which preponderate at the present day. Preceding them, and making possible their rise, had come the flowering plants which emerged in the cretaceous period just previous. The hoofed beasts or Ungulates were dominant, and were

divided into two groups with paired and unpaired hoofs, as representatives of which we may mention the 'Paleotherium,' and the 'Anthracotherium.' The Dinocerata found in the Rocky Mts. form a special group of Ungulates, which resembled the 'Proboscideans,' except for the fact that they had three pairs of horns and were armed with long sabre-like upper canines. They were also characterised by a diminutive brain in comparison with the size of the skull. The Carnivores were represented by the primitive Creodonts, and Rodents and Insectivores have been found. Regarding the fossils of Invertebrates, we find that the Ammonoidea and Belemnites, which flourished in Cretaceous time, have wholly disappeared, and with them the sponges and the Hippuritidae. The great reptilian families which flourished from



A FOSSIL OF THE EOCENE PERIOD

Palaeotherium magnum

Triassic time onward are practically extinct during E. time. The Molluscoidea are represented by forms which exist at the present day and the Coelenterata by reef-building corals. The Flora of the E. consisted mainly of Dicotyledons (tropical and subtropical forms), Monocotyledons (such as the Palms), and Conifers. See M. Gignoux, *Geologie stratigraphique*, 1923; C. Nevin, *Principles of Structural Geology*, 1931; R. Field, *Historical Geology*, 1933; S. Shand, *Earth Lore*, 1933; K. Mather and C. Roy, *Physical and Historical Geology*, 1931. See also EARTH; GEOLOGY; TERTIARY.

Eon de Beaumont, Charles Genevieve Louise Auguste Andre Timothee d' (Chevalier d'Eon) (1728-1810), Fr. diplomatist, and trusted agent in Louis XV's secret diplomacy, serving him in Russia (1755), and in England (1762-65). In 1759 he fought bravely as captain of the Fr. forces in Germany. He had assumed woman's dress on his first mission to Russia, and was desired, by the gov. (1777) to wear it for the rest of his life in France, whence many held that he was really a woman. His political and historical essays appeared (1775) as *Loisirs du Chevalier d'Eon*... See L. P. Bachaumont, *Memoires secrets*, 1777; F. M. Baron de Grimm, *Correspondence*... 1829-31; J. B. Telfer, *Strange Career of the Chevalier d'Eon*, 1885; A. Lang,

Historical Mysteries, 1904; his *Life and Times* by O. Homberg and F. Jousselin, 1911; M. Coryn, *The Chevalier D'Em*, 1932.

Eos, Gk. goddess of the dawn (Lat. *Aurora*), daughter of Hyperion and wife of Tithonus.

Eötvös (or *Eoetvös*), József, Baron (1813-71), Hungarian statesman and author, b. at Buda, leader of the Centralist Liberal party (1844), and a supporter of Kossuth, contributing to his *Pesti Hírlap* numerous articles, collected later as *Reform*. He wrote the comedies *Kritikusok* and *Házasságok*, and the tragedy *Boszú* (1830-33). Of his novels, *Karthausi* (1842), *A falu jegyzője* ('The Village Notary', 1844-46), and *Magyarország* 1514-ben (1847-48) won much fame. He was minister of public instruction in 1867, and did much for elementary education and religious toleration in Hungary.

Eötvös, Roland, Baron (1848-1919), Hungarian statesman and physicist; b. at Budapest; son of Baron József E. Educated at Königsberg and Heidelberg. At Budapest: 1871, lecturer; 1873, prof. of experimental physics. From 1873, connected with Hungarian Academy of Sciences; president from 1889. He made many curious discoveries with regard to gravitation and capillary attraction. Life member of Hungarian House of Magnates. Minister of public worship and education, 1895-96.

Eozoon, peculiar structures of calcite and serpentine, something similar to Stromatopora and other hydroid corals, found among the early crystalline gneisses and schists of the lower St. Lawrence valley and the Archaean limestones of Canada. The researches of Möbius and others go to prove that they are a mineral concretion or segregation of purely inorganic origin. E. has been discovered in rocks of the same age in Bavaria and in limestone blocks thrown from the crater of Vesuvius.

Epacridaceae, a family of dicotyledonous plants closely allied to the Ericaceae (heather family) with the small-leaved genera of which they agree in habit, and from which they are scarcely distinguishable. They are to be found wild in Australia as shrubs with alternate or occasionally opposite leaves, and in Brit. greenhouses are cultivated for their showy flowers. Two of the chief genera are *Epacris* and *Draconophyllum*.

Epaots, intercalary (brought in) days, the excess of a solar over a lunar month or year in days. The E. for any year is the number of days in the moon's age on the first day of the year (January 1, in the Gregorian and early Lat. calendars; March 22, in the Dionysian calendar, or old style). The number varies for each year (usually increasing by eleven from one year to the next). E. are used for fixing the dates of movable feasts of the church. See GOLDEN NUMBER.

Epaminondas (c. 418-362 B.C.), brave and upright Theban general and statesman, of a poor but noble family. After the Thebans had recovered the 'Cadmeia' and expelled the Spartans (379), he speedily became a democratic leader, and was

sent to represent Thebes at the Spartan Congress (371). He refused to surrender the Boeotian cities, aiming at a Boeotian confederacy under Thebes. War followed and the Spartan supremacy was crushed at Leuctra (371). With Pelopidas he invaded the Peloponnesus, restored Messenia's independence, and founded Megalopolis (Arcadia) (369). During a fourth invasion of the Peloponnesus E. was slain in the Theban victory at Mantinea (362). He made great innovations in military tactics. See life by L. Pomptow, 1870.

Epaulement, a part of siege-works or a covering mass in military fortifications, raised to protect the troops from the enemy's fire. It differs from a parapet in making no provision for firing over it by the defenders. Siege batteries are usually shielded by one so constructed as to form an obtuse angle with the main line of battery, protecting the gunners from flank fire. It is used in general of any screen designed to protect the troops.

Epaulettes, or **Epaulets**, a fringed shoulder-piece or ornamental badge of rank worn as part of a uniform, especially naval or military, probably a survival of the medieval metal shoulder-plate (sixteenth century). It was adopted by commissioned officers in the Brit. navy (1795), and is usually of gold bullion with various devices and embroidered designs to mark the degree of rank. Formerly E. were worn by nearly all armies and navies, but after 1855 they were no longer worn in the Brit. army by all ranks, and in U.S.A. only general officers of the army wore them after 1872. After the Russian Revolution of 1917 E. were discontinued in the Red Army, but were restored before the Second World War. See UNIFORMS.

Epée, Charles Michel, Abbe de P' (1712-89), Fr. Jansenist, b. at Versailles. One of the founders of the system for instructing deaf-mutes largely by means of the manual alphabet and signs. He founded a school for the purpose (1755). His *Dictionnaire général des signes* was completed by Abbé Sicard. See lives by Vallette, 1857; Morel, 1833; Berthier, 1852; and P. Schumann, *Geschichte des Taubstummenwesens*, 1910.

Epéhy, Battle of, see FRANCE AND FLANDERS, FIRST WORLD WAR, CAMPAIGNS IN—1918.

Eperies, see PREŠOV.

Epernay (Aque Perennes), tn. of Marne dept., France, on the Marne, 18 m. from Rheims. It is an important entrepôt for Champagne wines, which are stored in vaults in the chalk rock. Spinning, tanning, and brewing are carried on, and corks, casks, and pottery manufactured. It was frequently bombarded during the First World War, but was held by the Fr. garrison aided by a Brit. contingent. Pop. 19,700, arron., 88,600.

Ephemera, a genus of insects belonging to the order, often known as Day-flies or May-flies (Ephemeroptera), which somewhat resemble dragon flies, and as adults live only for one day. They have a voracious larval existence in water, sometimes lasting for two or three years. The insect as it emerges from the water is

called the 'sub-imago,' and after shedding its delicate covering becomes a full-grown 'imago.' They haunt riv.-banks and ponds on summer evenings. The sub-imago and imago are used as baits by anglers, and called 'green drakes,' and 'grey drakes,' respectively. *E. vulgata* is the best-known species. Other genera of May-flies are *Palingenia*, *Cloe*, *Cenis*, and *Heptagenia* or *Bætis*.

Ephemeris, a table stating for successive days the predicted position of and other particulars concerning heavenly bodies. The *Astronomical Ephemeris*, or *Nautical Almanac* of the United Kingdom, is pub. annually, containing ephemerides of the chief stars and planets, data of eclipses, etc. France, Germany, Spain, and U.S.A. issue similar almanacs.

Ephesians, Epistle to the, a letter bearing the name of St. Paul, addressed to the Christians at Ephesus, one of the chief cities of Asia Minor, at which the Apostle had spent two years (Acts xix. 8 ff.) on an earlier occasion. The tone of the epistle, however, shows no restriction to a local church, and this, coupled with the facts that the words 'at Ephesus' in the first verse are omitted in some MSS., and that there is no reference to individual Ephesians, has led to the hypothesis that the letter is indeed an epistle general. The date of the epistle is usually placed during St. Paul's imprisonment at Rome, about A.D. 60-65, and there is now substantial agreement as to its authenticity. Its Pauline authorship was, however, denied by the Tübingen and Dutch schools. The subject of the letter, the mystic unity of the Church in Christ, closely resembles that of the Epistle to the Colossians, a fact which supports the theory which makes them almost contemporary. See J. Robinson, *Ephesians*, 1904; H. Bate, *Guide to the Epistles of St. Paul*, 1926; E. Goodspeed, *The Meaning of the Ephesians*, 1933; L. Chafer, *The Ephesian Letter*, 1935; F. Syngé, *St. Paul's Epistle to the Ephesians*, 1941.

Ephesus, famous anct. city of W. Asia Minor, probably founded about the eleventh century B.C. Its ruins still exist on the banks of the Cayster, near the gulf of Scala Nova, 35 m. from Izmir (Smyrna). It was chief of the twelve Ionic colonies from Greece, situated in Lydia. E. was subject in turn to Croesus (560 B.C.), the Persians (479-387), Athenians, Macedonians, and Romans. It was noted for its temple and worship of Artemis (Diana), the great nature-goddess of Asia Minor. This temple (rebuilt after 356 B.C.) was considered one of the wonders of the world; it was destroyed by the Gotus (A.D. 263). Besides its ruins, there are interesting remains of a fine theatre, odeum, and stadium. Excavations have been systematically carried on only since the nineteenth century (c. 1874) by the Austrian Archaeological Institute, and by Wood and Hogarth for England. E. was the bp. of Heraclitus, scene of the Legend of the Seven Sleepers, and seat of the Ionian school of painting. St. Paul visited it sev. times (see Acts xviii.-xix.). The railway from Smyrna to Aidin passes the

anct. site, and Ayasuluk is the chief vil. near it. See E. Falkner, *Ephesus and the Temple of Diana*, 1862; J. T. Wood, *Discoveries at Ephesus*, 1877; J. Ferguson, *Temple of Diana*, 1883; O. Benndorf, and others in *Forschungen in Ephesos*, i., 1906 (Austrian Archaeological Institute); D. Hogarth, *Excavations at Ephesus*, 1908; C. Picard, *Ephesus and Claros*, 1922; G. Cummins, *The Great Days of Ephesus*, 1933.

Ephesus, Councils of. The third ecumenical council, convoked by Theodosius II., under the presidency of Cyril of Alexandria, A.D. 431, was notable for the attendance, for the first time, of papal delegates from Rome, who were instructed to adjudicate on the opinions of the Council, but to abstain from debate. This Council condemned the heresy of Nestorius, but did not itself definitely state the prevailing doctrine. Theodosius also convoked the 'Robber' Council of A.D. 449 held under Dioscurus of Alexandria, which restored Eutyches as archimandrite and priest, from which office he had been driven by the Synod of Constantinople, and deposed Flavian, the Patriarch.

Ephialtes: (1) The Malian traitor, who showed the Persians the mt. defile of Anopra. Following this, they came up behind Leonidas and his Spartan band and overcame them at the Pass of Thermopylae (480 B.C.). (2) Athenian statesman, political friend of Pericles, and opponent of Cimon. He helped to pass democratic reforms (c. 462 B.C.), and limited the power of the Areopagus. He was probably assassinated at the oligarch's instigation (c. 456). See Plutarch, *Pericles*; *History of Greece*, of George Grote (1816-56), and Connop Thirlwall (1835-47). (3) A son of Poseidon and Iphimedia, one of the giants who revolted against Zeus, piling Pelion and Ossa upon Olympus. See ALOIDÆ.

Ephod (perhaps from Heb. *āphad*, to put on, clothe): (1) A Jewish priestly vestment, especially that worn by the high-priest, of blue, purple, scarlet and fine linen (byssus) interwoven with gold thread. Similar garments of plain white linen were apparently worn by any servant of the temple. They were sleeveless, with buckles of onyx stone on the shoulder-straps, the names of the twelve tribes being inscribed, six on each buckle. In front the high priests wore the jewelled breastplate with the oracle-pouch for the Urim and Thummim. See Exod. xxviii.; 1 Sam. ii., xxii.; 2 Sam. vii. (2) Apparently an image, forming part of the equipment of a sanctuary. It was revered and perhaps used in connection with the teraphim in divination.

See Judges viii., xvii., xviii.; 1 Sam. xxi., xxiii.

Ephori, or **Ephors**, chief magistrates of the anct. state of Sparta. They were five in number, and were elected by and from the people without any qualification of age or property. Their authority gradually widened until it included a superintendence over the whole commonwealth, including the kings, and they had the right of calling them to account for their

actions and of punishing them with fines and reprimands, and even of prosecuting them before the senate.

Ephorus (fl. c. 340 B.C.), Gk. historian, b. in Cymæ, Asia Minor. He was the author of a universal hist., which treated the hist. of the Gk. and barbarian world, during a space of 750 years, ending in 340 B.C. It was much read, and in spite of hostile criticism was admitted by many, among them Polybius.

Ephraem, or Ephraim (fl. A.D. 370), Syrian writer, b. at Nisibis. He spent the early years of his life in his native city, engaged in study, but after its surrender to the Persians by Jovian in 363 went to Edessa. Here he seems to have spent his life as a hermit outside the city, engaged in teaching and writing. He was ordained deacon, but refused to accept any further promotion in the church. At the time of the famine in Edessa he rendered great assistance to the suffering poor by urging the rich to deny themselves for their brethren's good. His writings were in Syriac, for he knew no other language, and consist of treatises on theological subjects, epistles and addresses to monks, apophthegms, homilies on parts of Scripture and characters in the O.T., and hymns. They were held in very high esteem, and most of them were translated both into Lat. and Gk. The standard ed. of his works is that of Assemani (Rome, 1732-46). An Eng. trans. of some of his pieces was pub. by Henry Burgess in 1853. By the Rom. Catholics he is numbered among the Doctors of the Church.

Ephraim, the younger son of Joseph, who was exalted by his father's benediction above his elder brother Manasseh. He was the ancestor, according to the Jewish tradition, of the tribe of Ephraim, which with the tribe of Manasseh formed the 'house of Joseph' (Josh. xvii. 14; 2 Sam. xix. 20, etc.). The tribe of Benjamin earlier separated from these two. Ephraim, which had within its borders many important places, was the chief of the tribes of the N. kingdom, and its name is often used as synonymous with that of Israel. Chief among these places may be named Shechem, the burial-place of Joseph, and the sanctuary of Shiloh. The tribe was a warlike one (Judges viii. 1, and xii. 1 ff.), and produced Joshua, the conqueror of the land of Canaan.

Epiplast, see EMBRYOLOGY.

Epicharmus (c. 540-450 B.C.), Gk. writer of comedies, b. in the is. of Cos. He spent the earlier part of his life in the study of philosophy, and did not begin writing comedies until his removal to Syracuse in 481. Of these thirty-five are extant, written in the Doric dialect, and to him is due the literary form of the Sicilian comedy. He introduced a regular plot and did away with the low buffoonery then current for comedy in Sicily. He took his subjects from the stories of gods and heroes as well as from life, and his plots seem to have been simple and the action rapid. His language was elegant, and he was celebrated for his choice of epithets; indeed, he was called by Plato, 'the prince of comedy.'

Epic Poetry (Gk. *ἐπος*, word, verse; *ἐπη*, poetry in hexameters), the name given to narrative or didactic poems of sufficient magnitude which are distinguished by beauty of thought and expression, and whose subjects possess both dignity and interest. Epics have sometimes been classified as sacred, heroic, allegorical, etc., but these divs. often merge into one another. Some again have been styled epics of growth, having been built up of old legends and traditions; others epics of art, created mainly by the poet's imagination.

Very early poetry consisted mainly of sacred hymns, tribal legends, and popular verses. The first narrative poems mentioned in hist. are those of anct. Greece. Designed for chanting and recitation, and for centuries poetry continued to be mainly oral, being carefully memorised by trained singers, who thus carried on from one generation to another the traditions of their race. Now and again some occasion would be marked by the production of a new poem, many a forgotten bard 'leaving great verse unto a little clan.' The *Iliad* and *Odyssey*, greatest of Gk. epics, are ascribed to Homer, but of that poet himself nothing is certainly known, not even his birthplace or the date of his existence. Even his authorship of the poems has been contested, some critics alleging them to be a collection brought together from anct. sources. A doubt whether writing was commonly used, if at all, in Homer's time, has been urged by some who maintain that works of such magnitude as the *Iliad* and *Odyssey* cannot have been the oral productions of one man. It is also contended that there are differences in character, manners, and ideas which show the *Odyssey* to be of much later date than the *Iliad*. But such scepticism has been overdone. It is agreed that these poems are not only the oldest but also among the noblest in the world, and they have greatly influenced the subsequent poetry of all Western nations. Hesiod, the second great poet of anct. Greece, though according to one tradition contemporary with Homer, probably lived some time later. His works are a mixture of epic and didactic verse, *The Works and Days*, being something like Virgil's *Georgics*. Another reputedly his, the *Theogony*, is on a grander scale, dealing with Gk. stories of the creation and of the early gods and demi-gods. Its revolt of the Titans helped to inspire the sixth book of *Paradise Lost*. In the dawn of Rom. literature writers often looked to Greece for their models. Ennius (239-169 B.C.), when writing his *Annals*, a poetical chronicle of Rom. hist., took his metre from Homer instead of adhering to the old Saturnian verse. Virgil (70-19 B.C.) wrote, also in hexameters, the *Æneid*, which has ever since been regarded as a type of perfect art: yet its author was so dissatisfied with it that when dying he left word for the MS. to be burned, but this was forbidden by Augustus. No other Lat. epic-writer ever approached the excellence of Virgil. As the sagas of Greece were wrought into-

great poems, so in medieval Europe legends clustering round the names of historical personages like Alexander or Charlemagne, or of national and sometimes mythical heroes such as Siegfried or King Arthur, became in many instances moulded into epics. Of the Teutonic lays, the *Nibelungenlied*, telling the story of Siegfried and Kriemhild, and the fatal Nibelung treasure, takes rank as one of the greatest of poetic romances. It has sometimes been paralleled with the *Iliad*, not for beauty of style or pictorial description, but as containing more human interest and development of character, and being more complete as a narrative. An earlier version of some part of the story, wilder and full of Scandinavian magic, is found in the *Volsunga Saga*. In the *Nibelungenlied* the pagan atmosphere is somewhat modified, but the whole is fierce and sad, and the closing scenes terribly tragic. Among other Teutonic epics the best is *Beowulf*; another fine one is *Havelok*, the scene of which is partly laid in Lincolnshire. Among the greatest of Icelandic sagas, which, in unrhymed poetry marked with frequent alliteration, related early Norse histories and legends, were the stories of *Burnt Njal*, *Grettir the Strong*, the *Laxdala-saga*, and *King Olaf*. The authors of many fine sagas are unknown; the last and greatest whose name has survived was Sturla Thordsson (1215-84). Fr. medieval epics were composed of song-cycles clustering round central figures or groups, the *Geste du Roi*, for example, relating the legends of Charlemagne and his warriors. To this set belong the *Chanson de Roland*, *Ogier the Dane*, and other great lays. The original chansons or gestes, the work of itinerant jongleurs, already displayed much of the clearness, eloquence, and force so characteristic of Fr. literature. The *Roland* is the finest lay of feudal chivalry. The one great epic of Spain was the *Poem of the Cid*, written in the twelfth century; the Cid Campeador himself died in 1099.

In more modern times epics have gradually been superseded by the drama and the novel, though Italy and England have produced two masterpieces, the *Divina Commedia* of Dante and Milton's *Paradise Lost*. These are the only modern poems which, for sustained beauty and grandeur both of thought and diction, take rank with the *Iliad* and *Odyssey*. Other It. epics of note are Tasso's *Jerusalem Delivered* (1575), and various romantic and burlesque poems by Pulci, Ariosto, and others. Sev. distinguished Fr. authors, including Voltaire, have written historical poems, but with no great success. Boileau's mock-heroic *Lutrin*, however, has been much admired, like Pope's *Rape of the Lock*. The famous *Lusiads*, so distinguished in the literature of its nation that Portuguese has been called 'the language of Camoens', is a spirited and fanciful epic on the adventures of Vasco da Gama. Various mythical and romantic episodes are introduced; Venus, Mars, Bacchus, Neptune, and Tethys taking part with Portuguese leaders and Oriental princes in the development of the plot.

Besides *Paradise Lost*, England has one great allegorical success, the *Faerie Queene*, and many ambitious failures. Who now remembers the 'epics' of Davenant, Cowley, and Blackmore, even by name? But of what may be called miniature epics, *Marmion* is a fine specimen, containing as it does one of the finest battle-scenes in all literature. There are also Morris's *Sigurd the Volsung*, and Hardy's epic drama, *The Dynasts*. A very curious national poem, the *Kalevala*, consists of a series of Finnish mythical and magical legends, collected and arranged into a written form by Dr. Topellius and later produced in a more complete and systematised form by Dr. Lönnrot (1835, 1849). His trans. was made in a metre which Longfellow copied in his *Hiawatha*. The whole poem, however, rather deserves the name of a book of rambling chronicles than an epic.

The most famous of Oriental epics are the Persian *Shah Nameh*, and the Indian *Mahabharata* and *Ramayana*.

See W. P. Ker, *Epic and Romance*, 1897; Gilbert Murray, *History of Ancient Greek Literature*, 1897; J. Clark, *A History of Epic Poetry*, 1900; W. M. Dixon, *English Epic and Heroic Poetry*, 1912; H. M. Chadwick, *The Heroic Age*, 1912 and *The Growth of Literature*, 1932; L. Abercrombie, *The Epic*, 1914; J. Bedier, *Les Légendes épiques* (2nd ed.) 1914-21; E. Nitchie, *Vergil and the English Poets*, 1919; H. J. Rose, *Handbook of Greek Literature* (3rd ed.), 1948.

Epictetus, Gk. philosopher, b. at Hierapolis in Phrygia. He lived a long time in Rome as a slave in the house of Epaphroditus, a favourite of Nero. Receiving his freedom from his master, he became a prof. of the Stoical system, which he learned from the lectures of Musonius Rufus. He taught first at Rome, but after the expulsion of the philosophers by Domitian in A.D. 94, went to Nicopolis in Epirus. Here he appears to have spent the rest of his life, for the discourses which Arrian took down in writing were delivered by E. when an old man at Nicopolis. He was favoured by the Emperor Hadrian, but little else is known of his life, except that he was lame and very poor. He formed numerous disciples by free conversations after the manner of Socrates, and one of these, Arrian, compiled the short manual *Enchiridion*, which bears the name of E. He also wrote the philosophical lectures of his master in eight books, from which some account of his doctrine may be gathered. The main point on which he laid stress was the independence of the human mind of all external circumstances, such being not in our power. This freedom is to be attained by patience and renunciation. The duty of man is to find all his happiness within himself, and the power of which he should be most sure is the deity in his own breast. For an account of his teaching, see E. A. Abbott, *Silvanus the Christian*, 1906. The chief ed. of the works of E. is that of J. Schweighäuser (6 vols., 1799-1800; Eng. trans. by Elizabeth Carter and G. Long). See also eds. by H. Schenkl (1894, 1895),

and by P. Matheson, 1917. There are studies by A. Bonhöffer (1890-1911) and T. Zahn, *Der Stoiker Epiktet und sein Verhältnis zum Christentum* (2nd ed.) 1895.

Epicureanism, system of philosophy in which human happiness was regarded as the highest good. It was founded by Epicurus, who claimed to be independent of all his predecessors, but he was in reality indebted both to the Cyrenaics and Democritus. His system, however, differed from that of the Cyrenaics in his conception of pleasure. This he regarded as something lasting and imperishable, consisting in pure and noble mental enjoyments, i.e. in the freedom from all influences which disturb our peace of mind, and thereby our happiness. His *summum bonum* was peace of mind, and this he based upon *aponévous*, which he described as the beginning of all good and the origin of all virtues. In his physics he followed the materialistic systems of Democritus, and his views are set forth in the *De Rerum Natura* of Lucretius. According to him we obtain our knowledge of things from *εἰδωλα* or images of things which are reflected from them and pass through our senses into our minds. Of the gods, too, he considers we obtain our knowledge in the same way, and he regards them as in the enjoyment of perfect happiness which would be interrupted if they took part in the government of the world, therefore they exercise no influence upon the world of man. Epicurus had numerous pupils who propagated his doctrines, and yet no system of philosophy has been so much attacked as his. This was probably owing to a great extent to the conduct of the men who called themselves Epicureans, and gave themselves up to the enjoyment of sensual pleasures. When St. Paul encountered the Epicureans, they had certainly become materialists (Acts xvii. 18). The word 'epicurean' survives in the speech of modern Palestinian Jews in the form of *Epikoria*, a term of opprobrium applied to apostates from the ancestral faith. See J. Watson, *Hedonistic Theories*, 1895; W. Pater, *Marius the Epicurean*, 1913 (Everyman's Library, 1934); A. Kelm, *L'Epicurisme*, 1924.

Epicurus (312-270 B.C.), a (Gk. philosopher, founder of the Epicurean school, which was so named after him, born in Samos, where he spent the first eighteen years of his life. He began the study of philosophy at an early age, and in 310 began to teach first in Mytilene and afterwards in Lampsacus. In 306 he went to Athens and purchased a garden, the famous *Κήποι Ἐπικούρου*, in which he estab. his philosophical school. Here, surrounded by his friends and pupils, and three brothers Neocles, Charidemus, and Aristobulus, he spent the rest of his life engaged in the study of philosophy. His mode of living was simple and his habits temperate; he was a kind-hearted friend and a patriotic citizen. Of his works only a few are extant, although he appears to have been a prolific writer and, according to Diogenes Laertius, was the author of 300 vols. All that remains of them are some fragments of his great work *Περὶ*

φύσεως, three letters, besides his will, and a compendium of his doctrine in forty-four short propositions, written for his scholars to learn by heart. Gassendi in 1646-49 pub. a Lat. Life of Epicurus and a defence of his philosophy. A good account of his teaching is given by J. E. Erdmann, *History of Philosophy*, vol. i.; A. Rogers, *History of Philosophy* (chapters on the later ethical period); A. Benn, *Greek Philosophers* (vol. ii., 2) 1882; W. Wallace, *Epicureanism*, 1880; see also P. Gardner, *New Chapters in Greek History* (xii.) and Courtney's chapter on Epicureanism in *Hellenica*; C. Bailey, *Epicurus* (the extant remains), 1927, and *The Greek Atomists and Epicurus*, 1928; and works by P. Von der Mühl (text and notes), 1922; E. Zeller (trans.) 1889; J. Meuwaldt, *Die geistige Einheit Epikurus'*, 1927.

Epicycle, in anct. astronomy, a small circle, which was supposed to move on the circumference of a larger one called the 'deferent.' It was used for representing the motions of the heavenly bodies and when the observed motion was so irregular and complicated as not to be resolved with one E., others were added, till a nearer approximation was obtained. Thus heaping of E. on E. resulted in a complex entanglement, and, as soon as astronomers came to understand and test the Copernican theory, this system sank into oblivion.

Epidamnus, see DURAZZO.

Epidaurum, see DUBROVNIK.

Epidaurus, tn. of anct. Greece, situated in a recess of the Saronic Gulf, on the E. coast of Peloponnesus in a dist. called Argolis, under the Romans. It was originally inhabited by Ionians and Carians, whence it was called Epicarus, but it was subdued by the Dorians under Deiphontes, who thus became the ruling race. It was the chief seat of the worship of Esculapius. The temple of this god lay on the highway to Argos, 5 in. W. of E., and was frequented by patients from all parts of the Hellenic world. A few ruins are still extant, and the sacred enclosure is even now called Hieron or the Sanctuary. The remains of the theatre (1st century B.C.) are well preserved. (See illustration, p. 394.)

Epidemic, general term to express common to, or affecting, a whole people, or many people; prevalent; general. It is applied to mental, moral, social, and physical phenomena, as an E. of suicide, E. folly. Technically, in sanitary science, it means a contagious disease, or generally a wide-spread disease. The term E. is equally applicable to disease occurring both in men and in animals. It has the advantage of directing attention to the fact that a disease affecting but few individuals in any one locality may have a very wide distribution, as E. meningitis and other diseases, which require great administrative consideration to adopt measures for limiting and eradicating a disease. Diseases caused by lack of vitamins, such as scurvy and beri-beri, often assume E. forms. The term E. is a disease coming on a people, and is used in

contradistinction to endemic, a disease in a community (*q.v.*). When an E. spreads quickly over whole countries or expanses of the earth, affecting large numbers of the pop., it is known as a *pandemic*. Such was the influenza E. of 1918.

Epidemic Hæmoglobinuria, see BLACK-WATER FEVER.

Epidemiology is the science of epidemics, and is concerned with the cause, infectivity, epidemic and pandemic manifestations of infective diseases, and their prevention. Epidemics and pandemics result from the conjunction of three essential factors: (1) An available store of organisms causing the disease. (2)

probable periods of recrudescence. Application of the results of E. should eventually lead to the prevention of infective diseases. See C. O. Stallybrass, *The Principles of Epidemiology*, 1931; Maj. Greenwood, *Epidemiology: historical and experimental*, 1932; *Epidemiological Report* (League of Nations), 1934.

Epidermis, see SKIN.

Episcope, magic lantern combined with an **episcopes** which can project opaque as well as translucent pictures. An episcope projects only opaque pictures.

Epido, mineral of a green or grey colour, which is composed of silica, alumina, lime, oxide of iron, and oxide of



THE RUINS OF THE THEATRE AT EPIDAUROS

Effective transmission of these organisms in sufficient numbers. (3) Other individuals with tissues susceptible to the organisms. Many secondary factors also operate, and the effect of an infective disease on individuals may depend on age, sex, relative immunity, climate, and other conditions. The co-operation of doctors, bacteriologists and other pathologists, and of mathematicians, is essential to advancement of E. In clinics, observations on the interaction of host and parasite (see PARASITE) are made, and the discovery that healthy people may act as carriers and may distribute organisms causing infectious diseases was one of the most important during the present century. The scientist who observes the life-history and reactions of these organisms contributes facts on which preventive measures can be based, and the statistician analyses such large numbers of results that he can detect, and sometimes correct, possible errors in observations and records. Curves obtained by graphing statistics make it possible to predict the probable course of an epidemic and its

manganese. Fine crystals, 3 in. in length, are found at Arendale in Norway, and also in Sweden, and at Franconia in New Hampshire; and some good specimens come from Piedmont.

Epiglottis, leaf-like lid of yellow elastic tissue which covers the glottis (the opening of the larynx) during the act of swallowing. A long stalklike ligament (the *thyro-epiglottidean*) connects it inside the larynx with the thyroid cartilages.

Epigoni, descendants of the seven heroes who perished before Thebes. Ten years after their death the E. marched against Thebes to avenge their fathers; took possession of the city, and razed it to the ground. The names of the E. are not identical in all accounts: but usually the lists contain Alcmaeon, Aegialeus, Diomedes, Promachus, Sthenelus, Thersander, and Euryalus. Aeschylus' *Seven Against Thebes* (467 B.C.) has as its theme the beleaguering of Thebes by these heroes in championship of the claim of Polyneices, and the mutually fatal single combat between the latter and his brother Eteocles.

Epigram, properly an inscription, such as was often written upon a tomb or a work of art to describe its character. Inscriptions of this sort were from early times put into metrical form, and the writer generally tried to put good sense and spirit into them. They were generally, though not always, written in the elegiac metre. The greatest master of E. was Simonides of Ceos, the author of almost all the sepulchral inscriptions on the warriors who fell in the Persian wars. One of the most famous of his E.s. was that written on the heroes who fell at Thermopylae. The form of the E. was also used to embody in concise and pointed language the clever ideas or the passing moods of the writer, often with a tinge of wit or satire, and it was a very favourite form of composition with the Alexandrian poets, some writers devoting themselves entirely to it. Indeed, some of the choicest gems of Gk. literature are to be found in the E.s.; the Gk. anthology has preserved 4500 E.s. The art was also practised in Rome from Ennius till the latest times, and in the second half of the first century A.D. Martial handled it with the power of a master. After the revival of learning the E. evolved into a short poem on a single topic, concluding with a witty or satirical remark. Voltaire is preeminent in this kind of E. Among Eng. poets there is no writer whose fame rests solely on his E.s. Many practised the art, e.g. Thomas Campion and John Owen (in Lat.), Sir John Davies, Gulliver, Bostard, Harrington, Weever, Donne, Peacham, Parrot, Davies of Hereford, Rowlands, Heath, Ben Johnson (in his *Underwoods*), Herrick, Dryden, Waller. Prior; but the best epigrammatical writer in Eng. literature was Pope. Coleridge epigrammatically defined an E. thus: 'What is an Epigram? A dwarfish whole, its body brevity, and wit its soul.'

Epigraphy, the study of inscriptions. It is mostly concerned with inscriptions on rigid materials, such as stone, metal, bone, shell and wood, or materials which may become rigid, e.g. clay. It includes incidental scratchings, such as graffiti like those on the anc. walls of Pompeii, but inscriptions on flexible materials such as papyrus, parchment and paper are the province of palaeography (q.v.).

Epilepsy, a nervous disorder characterised by sudden loss of consciousness and attended by convulsions. The disorder is specially noticeable as affecting individuals of great mental or physical vigour. Rightly or wrongly there are traditions that Hercules, Caesar, Mohammed, and Napoleon had E. In some cases it is hereditary. Epileptic fits are characterised by the nature of the convulsion, the alteration in the expression, the condition of the eyes, and subsequent exhaustion of mind and body. Sometimes the convulsions do not occur, or are so slight as only to be noticeable by experienced observers who are present at the time of the attack. These cases are known as epileptic vertigo (giddiness), minor E., masked E. or *petit mal*. In these cases the main characteristics are loss of consciousness and volition,

with loss of power to think and move. The onset of these cases is usually abrupt; their duration is short, lasting but a few seconds. Besides E. (i.e. major E. or *grand mal*, with convulsions and loss of consciousness; minor E., with loss of consciousness), there is also *partial E.*, with convulsions but not loss of consciousness. This partial, otherwise known as Jacksonian, E., is caused by a localised defect in the brain and when the locality is determined the defect, e.g. a tumour, can be operated on. *Aura*, literally a breath, is the feeling the epileptic has, as of a breath of air on some part of the skin, causing a shudder to reach the brain, and when the shudder reaches the brain, then the convulsions and (or) loss of consciousness occur. From its original meaning, an aura is applied to any warning of E.; the warning may be noticed by the patient, or sometimes only by others, as a change of habits or mental disposition. The dread of E. is due to the possibility that the mildest case may become grave, resulting in maniacal excitement and insanity. Though epileptics may maintain vigour of body, mental and moral integrity, there is always the possibility that the disease may become more serious, if not in the sufferer, then in a descendant. E. may follow any form of nervous defect or be followed by nervous defects in children. Such preceding or succeeding defects may be motor (i.e. causing paralysis), mental, or moral. Every epileptic and child of an epileptic should be under the best hygienic conditions conducive to health of both mind and body. Courses of treatment with potassium bromide are sometimes of benefit to sufferers from E., and luminal is also useful. During the attack the patient should be prevented, as far as possible, from injuring himself; a pad or piece of rubber placed between his teeth will prevent the tongue from being bitten. Those liable to frequent attacks are best treated in the special colonies described in the following article.

Epileptic Colonies, tracts of ground set apart for the care and training of epileptics. The idea was first conceived in 1887, and since that date numerous colonies have been formed in various countries. The first distinct attempt to provide for epileptics was inaugurated by a Lutheran pastor, Friedrich von Bodelschwingh, who founded at Bielefeld in Westphalia, Germany, the Bethel Colony, which has grown to be a vil. inhabited solely by epileptics. Here everything has been provided to meet their special needs. There are schools and industrial teachers, and physicians to study and treat their cases. Outdoor occupations are provided, special diet is arranged for, and there are all sorts of recreations and amusements. The first colony founded in England was at Chalfont in 1893; there are others at Liverpool, Godalming and Croydon.

Epilobium, a genus of Onagraceae, consisting of numerous species growing wild in colder climates; the Brit. species are commonly known as willow-herbs from

the similarity of the hairy seeds to those of the willow tree; in Canada they are called 'fire weeds.' *E. angustifolium*, the 'Rose bay' is very common on waste ground.

Epilogue, name given by the Gks. to the peroration of a speech, but is now generally applied to the appendix of any literary work, more particularly of a drama. As a literary form it has mostly been employed by Eng. writers; indeed, Ben Johnson made it a particular feature of his dramas, using it either to apologise for the defects of his play or to assert its merits. Later on the E. became very fashionable, and dealt with other subjects besides the preceding play, e.g. with politics, criticisms, etc., and at the time of the Restoration hardly a play was produced on the Eng. stage which did not finish with one. Dryden even wrote a *Defence of the Epilogue*.

Epimædium, see BARRENWORT.

Epimenides, poet and prophet of Crete, was a native of Phæstus, and appears to have spent most of his life in Cnossus. His hist. is largely mythical. All sorts of stories are told of his life, and he is said to have lived to a very great age. There is a legend that when a boy he was sent by his father in search of a sheep, and that sheltering from the sun in a cave he fell into a sleep which lasted 57 years. On waking and returning home, he found to his amazement, that his younger brother had grown to be an old man. But his visit to Athens is an historical fact and enables us to fix his period. He visited Athens about 590 B.C., at the invitation of its inhab., in order to undertake the purification of the city, which had been visited by a plague in consequence of the crime of Cylon. Many works were attributed to him by the ancients, and the Apostle Paul has preserved (*Titus*, i. 12) a celebrated verse of his against the Cretans.

Epimetheus (the man of afterthought) was the brother of Prometheus (the man of forethought). Zeus, in order to punish mortals, bestowed upon him Pandora, who was the cause of all the diseases and sufferings which befell mankind.

Epinal, tn. at the foot of the Vosges Mts., on the Moselle, cap. of the Fr. dept. Vosges. It is an important fort, and is also the centre of a cotton-spinning region, and manufs. cotton, machinery and iron goods. The water power of the Moselle is utilised for the iron works, the manuf. of the coloured pictures of saints and of textiles. Among its buildings are the Church of St. Maurice, with a twelfth-century tower, the museum, and the library, which contains some very valuable MSS. Taken by the Gers. in June, 1940. Occupied by U.S.A. forces on Sept. 26, 1944, a fortnight after a Seventh Army column driving N. against much opposition, had joined forces W. of E. with the right wing of Patton's Third Army which was partially immobilised through supply difficulties. Pop. 23,300, arron., 221,600.

Epinay, Louise Florence Pétronille Tardieu des Clavelles d' (1726-83), Fr.

writer, b. at Valenciennes. She was acquainted with the Fr. men of letters of her day, including Voltaire and Diderot, and was on an intimate footing with Rousseau (for whom she furnished a cottage in the valley of Montmorency) and afterwards with Grimm. Her publs. include *Mes Moments Heureux* (1752), *Lettres à mon Fils* (1758), *Conversations d'Emilie* (1774) which was crowned by the Fr. Academy; and *Mémoires et Correspondance*, her chief work, pub. in 1818.

Epiphanes, surname of Antiochus IV., who reigned over Syria from 175 to 164 B.C. Twice he seized Jerusalem, and the revolt of the Maccabees was the outcome of his cruel treatment of the conquered Jews.

Epiphanius, Saint (c. A.D. 315-402), a father of the church, b. in Palestine of Jewish parents, and after founding a monastery near Besanduan, his native vil., was in 367 appointed to the see of Constantia (formerly Salamis), in Cyprus. Although Jerome called him the 'Five-tongued,' in allusion to his linguistic powers, others account him ignorant, and all agree in finding his *Panarion* (ed. at Paris in 1622)—a hist. of eighty sects and heresies—the work of a bigot too zealous in condemning his opponents to weigh the justice of his ill-considered accusations. A violent controversialist, he condemned the doctrines of Origen in a Cyprian council of 401.

Epiphany. This word, in Gk., means an apparition of a divine being. The feast of the E. is a festival held by the Rom. Catholic and Anglican churches on Jan. 6, to commemorate the manifestation of Christ, and it includes three different events. From an early time in the East the feast was associated with the adoration of the Magi, the baptism of Christ, and the miracle of Cana. Many special observances were connected with the day, which under the name of Twelfth Night, in England, closed the Christmas festivities. The date of Easter for the year was formerly on this day solemnly announced to the faithful in the Rom. Catholic Church. The king of England still observes the day of the E. in the Chapel Royal by offerings of gold, frankincense, and myrrh at the altar. In both E. and W. the E. has always been a festival of the highest rank.

Epiphyllum, genus of Cactaceæ, indigenous to Brazil, but the showy flowers of the species make them favourite greenhouse plants in Britain. There are only four species, and these are generally epiphytic in habit. See EPIPHYTTES.

Epiphytes, plants which grow on others for support only; they do not absorb nourishment from the host as is the case with parasitic plants. A simple example of an E. is moss growing on the trunk of a tree. In forests, especially in the tropics, E. form quite a feature of the vegetation, and rare orchids are often found growing in the débris collected on the top of a tree; by this means they get more light than if they were growing on the ground. E. often have aerial roots which grow downwards, but never reach the ground;

they absorb nourishment and moisture from the air. See also PARASITES.

Epirus, div. of anc. Greece, corresponding to the S. of modern Albania, bounded by Illyria, Macedonia, and Thessaly, and stretching southward along the Ionian Sea to the Ambracian Gulf. The Gks. regarded the inhab. as semi-barbaric, but frequented the oracle of Dodona. The chief tns. were Ambracia (a colony from Corinth) and Phoenice. For a little over two centuries from 450 B.C. E. was ruled over by the Molossians, the most famous of whom was the redoubtable Pyrrhus, who offered a desperate resistance to the Roms. (295 B.C.). *Emilius* Paulus victimised the Epirotes with a most terrible policy of repression, when in

Constantinople, Larissa, and Janina, were founded by the lavish patriotism of Epirotes, who had made fortunes in other lands. Before the First World War, the Gks. of Northern E. had estab. more than 200 schools in that prov. The pop. of the 5000 sq. km. of Northern E. is about 200,000, of whom 60 per cent. are Gks.; but a great many others had been forced to emigrate between the two world wars. The pop. of the rest of E. before the late war was 363,000. In the It. invasion of Albania (1939) the chief centre of fighting in E. was Argyrocastro. See C. N. Cross, *Epirus*, 1932.

Episcopacy (from Late Lat. *episcopatus*, office of a bishop, *episkopos*), the term applied to the system of church organisation where a bishop possesses the chief eccles. authority within a defined dist. or diocese. In this way it differs from both Presbyterianism and Congregationalism. The former has a gov. by elders, and in the latter the community of worshippers is autonomous. E. represents a very special conception of the Christian church. In this system, the bishop, in his own person, sums up the collective powers of the church in his diocese, by divinely bestowed authority. Thus, both individually and collectively, the bishops are the essential ties of Catholic unity. In the judgment of many observers, this is observed in the Rom. Catholic Church by the development of the supreme power of the papacy, which was finally confirmed at the Vatican Council (1870). In the modern Rom. Catholic Church, bishops of the Lat. rite exercise their sway in defined territories and in subordination to papal supremacy. In differing degrees the same is true of patriarchs of the Oriental rites in communion with Rome. Since the Reformation, the word is more especially connected with those churches which have preserved the episcopal model, while ceasing to be in communion with Rome. The Church of England is by far the most important of these, and, since the Reformation, has been the chief champion of E. against papal, Presbyterian, and Congregational pretensions. Anglican opinion is considerably divided as to the divine origin of E., but a great modification has taken place in the character of the Eng. episcopate with the constitutional changes of the eighteenth and nineteenth centuries. The episcopal office in its essentials has practically disappeared from the Protestant communities of the Continent, though the Lutheran churches of Denmark, Norway, and Sweden still preserve the episcopal system in something of its historical sense. England is the country where the prerogatives and functions of bishops have remained the least impaired. The Reformation, being guided by the king's own hands, was effected in a very conservative spirit, and although E. was abolished by law under the Commonwealth, the bishops were restored at the Restoration, and the thought and time of the monarchy were closely connected with them. In the Protestant Episcopal Church of the United States, the functions of the



Nancy Jenkins

CHILDREN OF EPIRUS

168 B.C. they assisted Macedonia in her bid for independence. Henceforward their hist. is a blank apart from their modern struggle for possession of N. E. Thrice in the last three decades before 1915 the Gks. had liberated and then been despoiled of the infertile prov. of Northern E. which even their interested enemies have acknowledged to be theirs by right. So deep-rooted was the conception of Northern E. as forming a geographical unit with the rest of E. and W. Macedonia that Ismail Kemal, founder of modern Albania, concluded an agreement in 1907 with Greece by which he himself specified that Northern E. should not be separated from the rest of Greece. At the Peace Conference in Paris (1946) M. Tsaldaris, Prime Minister of Greece, claimed that this prov., given to Albania after the First World War, must be restored to Greece. E. has always been the heart of Hellenism; practically all the higher educational centres of Greece, the univ. of Athens, the Museum of Fine Arts, the marble stadium, the four great women's colleges in Athens

bishops are similar to those of Eng. prelates. The bishops of the Methodist Episcopal Church of America derive their orders from Thomas Colne, a presbyter of the Church of England, who was ordained by John Wesley in 1784 as 'superintendent' of the Methodist Society in America. In all the anct. churches, E. is regarded as of divine origin, and the bishops are looked upon as the guardians of the tradition of apostolic orthodoxy. See J. Lightfoot, *Saint Paul's Epistle to the Philippians*, 1868; E. Hatch, *Organisation of the Early Christian Churches*, 1881; J. Reville, *Les Origines de l'Episcopat*, 1894; R. C. Moberly, *Ministerial Priesthood*, 1897; C. Jenkins and K. MacKenzie, *Episcopacy, ancient and modern*, 1939.

Episcopius, Simon (1583-1643), Dutch theologian, b. in Amsterdam, his real name being *Simon Bischoff*. It was he who gave form and system to the doctrines of Arminius, and who bravely endured a life of persecution rather than stifle his protest against the excessive dogmatism of the fanatic Calvinists of his day.

Episode, an incident in the life of an individual or people which is irrelevant to the broad march of events, that is, a deviation or, to use another metaphor, an excrescence. It is a Gk. word (*ἐπεισόδιος*) meaning 'after-entrance,' and, as Aristotle explains in his *Poetics*, was descriptive in the drama of all that happened between the choric songs. From the nature of their later origin, the scenes between the actors were, theoretically at least, subordinate to the performance of the chorus, and a rift in their continuity.

Epistaxis, bleeding from the nose. Apart from injury, this is not infrequent, both in boys and girls, just before or about the age of puberty. In older persons, it may indicate the onset of a fever, or febrile condition, as in a common cold. In all cases it indicates that there is more blood in the system than the veins are capable of containing. It is sometimes due to changes in the blood vessels themselves, or to changes in the heart, lungs or other organs when the circulation of the blood is impeded or when the blood is at high tension. *Treatment*.—Nose-bleeding is often salutary, and tends to subside of itself. When frequent or severe it can be checked by the application of water, cold or iced, to the neck or forehead; a cold key, or other application, is beneficial. Other useful expedients are: closing the bleeding nostril with the fingers; drawing off the blood from the head to other parts of the body, as by the application of fomentation or mustard to the abdomen or legs. E. is avoided by attention to the alimentary canal, or anything that disturbs the circulation, as violent emotion and violent exercises.

Epistemology, branch of philosophy, denoting inquiry into knowledge, its source, nature, and limitations. See KNOWLEDGE.

Epistle, in essence a letter, that is, a communication written to an individual at a distance, because actual conversation is for the time being impossible. An

arbitrary though very real distinction, however, has been drawn between the two. Thus E. suggests dignity, and literary style, and flavours, moreover, of the archaic, so that no one would think of describing the wonderfully intimate and vivacious letters of Robert Louis Stevenson as Es. As early, at least, as Rom. times it was the fashion to write and also to preserve letters which were likely to interest future generations. Cicero certainly had some thought of posterity as he penned those E. which his faithful freedman Tiro ed. after his death. Historically they are the most valuable collection of letters ever made, and naturally suggest themselves to any one who wishes to furnish proof of the inestimable worth of this species of contemporary record at once personal and full of life. Other classical writers of E. were the younger Pliny, Plutarch, and Seneca, whilst in the imperial days the 'literati' amused themselves by composing Es. purporting to be written by great men like Plato and Demosthenes. The N.T. contains the Pauline Es. and the Es. of James and Jude, whilst in the time of the early fathers Cyprian, Jerome and Augustine committed their thoughts and purposes to Es. The Horatian *Epistles* are really highly finished essays, but they have inspired a crowd of skilful imitators, among them Boileau, Scarron, and Voltaire in France, and Ben Jonson and Dryden in this country. The *Epistle to Dr. Arbuthnot* exhibits Pope in his noblest mood. See also articles under names of Epistles.

Epistolary Writing, see LETTERS.

Epistolæ Obscurorum Virorum ('Letters of Unknown Men') appeared in 1516, and were followed the next year by a second part, the work of Ulrich von Hutten. In feeling they were intensely Protestant, and thus spurred on the Reformation. As they were full of vehement denunciations of monks and scholastics, it is natural that fear of persecution should have induced the author to conceal his name. He has been variously identified with Grotius Rubianus, Hutten, Erasmus, and Reuchlin.

Epistyle (Lat. *epistylum*), in architecture, the E. is the lowest div. of the entablature (*q.v.*), consisting of the main beam that rests immediately upon the abacus, i.e. the upper member of the cap, of a column, supporting the architrave.

Epitaph is properly an inscription engraved on a tomb, though in its wider meaning it embraces verse written in memory of the dead, which was never carved on any monument. Brevity is the mark which distinguishes Es. from elegies. Four or five thousand years ago the Egyptians inscribed upon their sarcophagi the name, lineage, office, and life dates of their deceased. No nation has excelled the Gks. in the tenderness, grace, epigrammatic finish, and twilight sadness of their literary Es. Such Lat. invocations as 'Siste Viator' (Stay, traveller!) were naturally suggested by the position of the burial places close beside the public ways. Until a few centuries ago Lat. was the language of Es. in this country, the native

Eng. being discarded in favour of what Dr. Johnson called 'classical stability.' But this fashion, which puzzles some visitors to Poet's Corner in Westminster Abbey, London, is fortunately dying out.

Epithalamium was the song invoking all blessings and happiness which boys and girls of auct. Greece used to sing to the bride and bridegroom on their marriage. Sappho, Anacreon, and I'ndar wrote epithalamia, which thus found a worthy niche in literature. The finest nuptial hymns that have survived from the classics are Theocritus's eighteenth idyll, and Catullus's *Marriage of Thetis and Pelcus*. Spenser's *Epithalamium* is one of the gems of Eng. verse.

Epithelioma, new growth occurring on the skin, or growing in connection with the skin. It is usually caused by continued irritation, as on the tongue from an irregular tooth, or on the lip from a pipe. It may occur on the skin from continued irritation, as of soot in chimney sweeps, etc. It may commence as an innocent looking pimple and remain as such for months or years. After a time the growth breaks down and forms a sore or ulcer, which may persist for months and years. All spots and sores, especially when subject to continued irritation, should have immediate attention, or they may be fatal. The word cancer is a lay term, signifying a tumour, which has been fatal, or probably will be, and E., if untreated, is frequently fatal.

Epithelium, or **Epithelial Tissue** is widely distributed. Its most important situations are: (1) On the surface of the skin; (2) on mucous membranes; (3) on the inner or free surface of serous membranes; (4) on the inner surface of the heart, blood vessels, and lymphatics. Every epithelial tissue is formed entirely of cells united together with cohesive matter, and the mass thus formed closely invests the surface on which it is situated. It contains no blood-vessels, though plasma may diffuse through the minute channels sometimes existing between the cells. Nervous fibrils are usually abundant. The component cells vary in structure and shape, hence the most convenient classification of epithelial cells is according to shape and arrangement, viz.: (1) simple epithelia, subdivided into (a) pavement or scaly, as in such a serous membrane as the peritoneum; (b) columnar, e.g. lining the mucous membrane of intestines. 'Challice or goblet' cells are columnar cells distended with mucus; (c) spheroidal or glandular, e.g. in the liver; (d) ciliated, i.e. bearing spontaneously-moving filaments on their basal ends, as in nasal membrane. (2) Stratified E. of various types having cells in layers, the deeper usually columnar and the superficial ones flattened as in the E. of the front of the cornea. (3) Transitional E. of several types, but intermediate in character between (1) and (2), e.g. lining the ureters.

Epoch (Gk. *ἐποχή*, a pause) has a special astronomical meaning. It is impossible to determine the position of a planet or other body in its orbit unless its

place at a given point of time is known. This given moment is called the 'epoch,' although this word often implies the mean longitude of the body at that particular moment.

Epode, an essential part of the chorus in Gk. drama. It followed the strophe and antistrophe, being sung when the choir had returned to its original place. The E. was also a form of lyric invented by Archilochus and finely handled by Stesichorus. Horace imitated Archilochus's metre in his fifth book of *Odes*, which he accordingly named *Epodes*. In these, iambic trimeters and dimeters alternate.

Eponym (from Gk. *ἐπώνυμος*, derived from *ἐπώνυμ*, a name), the mythical individual who has given his name to a people sprung from his descendants. Legend says that Pelops beget the Peloponnesians; Dorus, the Dorians; and Italus, the Italians.

Epping, par. and tn. of Essex, England, situated to the N. of Epping Forest, about 16 m. N.E. by N. of London. It has an elevation of 380 ft. above the level of the sea. The forest was once part of the auct. forest of Waltham, and originally covered the whole of Essex co. What remains of it now is preserved by the city of London, and forms one of the largest and most frequented pleasure grounds of the country. It was for many years the constituency of Mr. Winston Churchill, (q.v.). Pop. 4900. See W. Addison, *Epping Forest: Its Literary and Historical Associations*, 1948.

Epsom (a corruption of Ebbisham, the local manor), mkt. tn., 144 m. S.S.W. of London, in Surrey, England. The Royal Medical College on the Downs was founded in 1851 as a school for doctors' sons. There are sculptures by Flaxman and Chantrey in the Gothic church (rebuilt in 1824). In 1618 the springs containing sulphate of magnesia were discovered, and it seemed likely that E. would become a fashionable inland spa. To-day, however, the waters are forgotten, and E. is famous because the Derby and Oaks are run on the race-course on the Downs near Tattenham Corner. Pop. 19,000.

Epsomite, or **Sulphate of Magnesia**, used as a fertiliser, also in dyeing cotton goods.

Epsom Salts were called because they were first manufd. by evaporating the water of the mineral springs at Epsom. But they occur also in sea water, in the mineral springs of Pullna and Seidlitz, etc., in the Stassfurt mines (as reichardtite), and in America are procurable from limestone beds. The chemical formula is $MgSO_4 \cdot 7H_2O$, and they are therefore described as hepta-hydrated magnesium sulphate. Their needle-like crystals belong to the orthorhombic system. In medicine E. S. are commonly used as a purgative; the intensely bitter taste can be disguised.

Epstein, Jacob (b. 1880), Russo-Polish sculptor, b. in New York, educated at the School of Art Students' League, New York. Later, he completed his training at the École des Beaux Arts, Paris. Migrated to London in 1904. Has become the most

criticised sculptor of the present day. One of his first works in England was the series of figures on the frieze of the Brit. Medical Association's building in the Strand, London (1908). Still more symbolic, and consequently still more provocative, are his 'Rima' in Hyde Park, London, his Oscar Wilde Memorial in the cemetery of Père Lachaise in Paris, and his figures of 'Night' and 'Day' on the London Transport premises in Broadway, Westminster. Other famous works are his 'Two Doves' and 'Marble Venus,' executed in 1913 and 1914 respectively. The figures are striking in their naturalistic treatment, and almost always suggest the embryonic. The cry of 'immoral' has been raised, notably over the Strand figures and the Wilde memorial which is the figure of a nude man whose sphinx-like face twists in a smile of mingled despair and tragic bitterness. In some beholders it evokes horror and resentment, in others wonder at the strength of realistic suggestion. Probably his loftiest contribution to art is the noble and dignified 'Maternity' in the Tate Gallery. He has also executed a large number of bronzes, especially portraits. One of his most recent bronzes is the 'Madonna and Child,' in which there is revealed 'a great emotional and formal suavity' in the movement of the arms of the two figures, while the general impression of the faces and figures visualised in the group is that of 'intense vexation of soul coupled with a spiritual recognition of the obstacles to be encountered in reaching happiness.' E. has also produced a number of drawings, the most characteristic of which are the neurotic 'The Sisters,' and the 'Mother and Son' series. His 'Genesis' (1931), is a bold conception which produced the usual storm of criticism as well as imitations by other sculptors. In retrospect now, it is difficult to understand the outcry which his early work caused. The novelty has worn off and the world has learnt to expect the sudden dynamic assault of his powerful personality. Yet the controversy was not merely one between the Philistines and the enlightened: for Roger Fry denied that E. was a master of sculpture, and both Paul Nash and Eric Gill criticised him adversely; but among his influential champions were G. B. Shaw, Sickert (who resigned from the Academy because of his admission), Rickets, Muirhead, Modigliani, and Matthew Smith. There is a sense in which it seems that E.'s vision has its origin in all that is greatest in the Jewish character. His 'Genesis' is a striking apocalyptic comment on our times, in which mankind is brought forth as a monster, swollen with a lust for destruction, and his 'Adam' has the same quality—man steeling himself to resist a universe which threatens his existence. His autobiography, *Let There be Sculpture*, appeared in 1940. See studies by B. van Dieren, 1920; and H. Wellington, 1925.

Epworth, mkt. tn. and the bp. of John Wesley (b. 1703), 10 m. N.N.W. of Gainsborough in Lincolnshire, England. Pop. 2000.

Equal-Area Projection, see PROJECTION. **'Equality State,'** see WYOMING.

Equation, a statement in mathematical form of equality between known and unknown numbers which is true only for certain values of the unknown but not for all. To solve an E. means to find the value or values of the unknown number which satisfy the E., e.g., $x + 4 = 7$ is true when x is 3. An E. that is true for all values of the unknown is called an *identity*, e.g., $x + x \equiv 2x$. Simple Es. are of the type $2x + 3x = 100 - 5x$, and the general method of solution of a simple E. is to transpose all the terms containing the unknown x on to the left-hand side and the numerical quantities on to the right-hand side. This may be done by using the property of an E. that if any term is taken from one side to the other its sign must be changed. All the x 's, then, are added together, and the right-hand divided by the coefficient of the x , whence the value of x is obtained. It is important to remember that the symbol x stands for a *numerical quantity*. When an E. contains two or more unknowns, e.g. $2x + 3y + 4z = 6$, it is called *indeterminate*. To get a definite solution of this E. two other relations between x, y, z must be given. The number of Es. required to get a definite solution of any E. containing two or more unknowns is the same as the number of unknowns. Such a group of Es. are called *simultaneous Es.* All the Es. cited above are called Es. of the *first degree*. The *degree* of an E. is determined from the highest power of the unknown occurring in the equation. Thus $x^2 - 6 = 9$ is one of the second degree, $x^3 + 3x + 3 = 0$ is one of the third degree, and so on. An E. of the second degree is sometimes called a quadratic, one of the third degree a cubic, and one of the fourth degree a biquadratic. A quadratic E. has *two* solutions or roots, which are either both *real* or both *imaginary*, e.g. the E. $x^2 - 5x + 4 = 0$ has roots $x = 1$ or 4 (real), and the E. $x^2 + 1 = 0$ has roots i or $-i$ (imaginary). In general an E. of the n th degree has n roots, but some of these may be imaginary. Imaginary roots always occur in pairs. The solution of Es. of higher degree than the quadratic Es. opens up the large subject of the *Theory of Equations*. This subject embraces all questions connected with the solution of every type of E. The cubic was first solved in 1505 by Scipio Ferreo, although the general method to solution is known as Cardan's method. This solution is, however, not due to Cardan, but was obtained by him from Tartaglia. The solution of the biquadratic was first obtained by Ferrari, who was a pupil of Cardan. Abel has shown, to the satisfaction of mathematicians, that it is impossible to obtain a general solution of Es. higher than those of the fourth degree. It may be pointed out that by means of the relations between the solutions or roots of the E. and the coefficients of the terms of the E., Es. of a higher order may be obtained provided some other relations are also known, e.g. a relation between the

roots themselves. But this obviously is a particular type of E., and is not embraced by Abel's demonstration. Approximate values of the roots of E.s. in which the coefficients are numerical may be found by employing *Horner's method of approximation* to any degree of accuracy. See W. S. Burnside and A. Panton, *Theory of Equations*, 1881; H. W. Turnbull, *The Theory of Equations*, 1939.

Differential Equations (*q.v.*) are of a special type involving differential coefficients. They have proved to be an invaluable tool in mathematics as applied to engineering, electricity and radio, and in the development of Relativity (*q.v.*) and Quantum Theory (*q.v.*): N. Miller, *Differential Equations*, 1935.

A **Binomial equation** is an algebraical E. consisting of only two terms. Its most general form is $a_1x^p \pm ax^q = 0$. This may be reduced to the form $x^r \pm a = 0$, where $p - q = r$ and $\frac{a_1}{a} = a$. The solu-

tion of this would be $x = \sqrt[r]{\pm a}$, showing that $x^r + a = 0$ has imaginary roots and $x^r - a$ has real roots.

Equation to a curve.—A curve may be viewed as the path traced out by a point moving under a given condition. If the co-ordinate (*q.v.*) (see also GRAPHS) of any point on the curve be taken, this condition can be expressed by a relation between the x co-ordinate and the y co-ordinate; this relation is termed the E. to the curve, e.g. $x^2 + y^2 = a^2$ is the E. for a circle.

Astronomical equations.—All the motions of the astronomical bodies can be reduced approximately to a simple law. For accurate results certain corrections have to be applied to the results obtained from the simple law. These corrections are termed astronomical E.s.

Equation of time. Through causes explained in the article on day (*q.v.*), the length of the solar day varies. To get a fixed measure of time astronomers conceive of an imaginary sun which moves uniformly in the celestial equator, completing its circuit in the same time as the real sun. The time given by this means is known as *mean solar time*, and *mean noon* is that time when the imaginary sun is on the meridian, the time when the real sun is on the meridian being known as *apparent noon*. Clocks keep *mean* and *sun-dials apparent* time, and the difference between these is known as the equation of time. On four occasions in the year, about April 15, June 15, Sept. 1, and Dec. 24, these coincide, and then, of course, the equation of time is zero.

Equation, Chemical. A C. E. represents both qualitatively and quantitatively the substances which react together and those which are produced. Every reaction must obey the law of the conservation of mass; and, therefore, the masses of each element shown on the left-hand side of the equation must be equal to those shown on the right-hand side. The equation $\text{CaCO}_3 + 2\text{HCl} = \text{CaCl}_2 + \text{H}_2\text{O} + \text{CO}_2$ expresses the fact that 100 grams of calcium carbonate (CaCO_3) react with

73 grams of hydrochloric acid (HCl), producing 111 grams of calcium chloride (CaCl_2), 44 grams of carbon dioxide (CO_2), and 18 grams of water (H_2O) (atomic weights $\text{Ca} = 40$, $\text{C} = 12$, $\text{O} = 16$, $\text{H} = 1$, $\text{Cl} = 35.5$). The equation further shows the relative volumes of the reacting gases and of the products. Since a gram molecule of any gas (e.g. $\text{HCl} = 1 + 35.5 = 36.5$ grams) occupies 22.4 litres under standard conditions of temp. and pressure, the equation shows that 44.8 litres of hydrochloric acid gas would produce, from sufficient calcium carbonate, 22.4 litres of carbon dioxide. In these respects a C. E. is very useful, but it has certain defects. As ordinarily written it does not show the physical states of the substances, whether solids, liquids, or gases; it does not deal adequately with the many cases of balanced action, nor show the thermal changes which accompany reactions, though many of these points can be indicated by the use of additional symbols or figures.

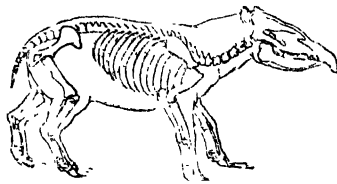
Equator (from Lato Lat. *aequator*, from *aequare*, to equalise), imaginary great circle drawn on the earth's surface in a plane at right angles to its axis, and equidistant from either pole. It is the dividing line between the N. and S. hemispheres. This E. is often called 'terrestrial' or 'geographical' to distinguish it from the 'celestial equator.' See EQUINOCTIAL.

When a ship crosses the E. or the 'line' it is customary for the crew to stage a mock ceremony on deck. Those who are making the passage for the first time, after making obeisance to King Neptune and his court, are lathered, shaved, and tossed into a bath of water; after which they receive 'Davy Jones's Certificate' in the form of a passport upon the high seas and conferring the 'Freedom of the Raging Main.' This now good-natured horse-play was once accompanied with much brutality.

Equatorial Current, see ATLANTIC OCEAN.

Equerry, in royal households, an officer in the dept. of the master of the horse, who accompanies the king or prince when he goes riding in state. The 'gentleman of the equerry' was originally in charge of the royal stables, the word E. being the Fr. *écurie*, stable.

Equidae. The horse family; in zoology a family of solidungulate perissodactyl



PALEOTHERIUM MAGNUM

This primitive ungulate of the Upper Eocene is regarded as being ancestral to the Horse family (hoofed animals). Middle digit and hoof enlarged, and alone support the body;

lateral more or less reduced in size and functionless. The first and fifth digits and corresponding metapodials, in living genera, are wanting; also the second and fourth, but the metapodials are present, though they are mere splint bones. The shaft of the ulna is atrophied, its extreme being consolidated with the radius; fibularis rudimentary and ankylosed with the tibia. Skull very elongated; lower jaw deep behind, and bony orbit of the eye is complete. Many fossil genera through the Tertiary, as *e.g.* *Hipparion*, *Mercurippus*, *Protohippus*, etc.

Equidistant Projection, see under PROJECTION.

Equilibrium, in mechanics, is the state of rest of a body under the action of two more forces. The E. may be *neutral*, *stable*, or *unstable*.

Neutral equilibrium.—If a body or a material system is balanced by the forces which act upon it in any position in which it may be placed, its E. is *neutral*. This is the case with a sphere or a circular cylinder of uniform material placed on a horizontal plane. Any body whose centre of gravity is at the fixed point of support, or is always at the same height above the point of support, is in neutral E.

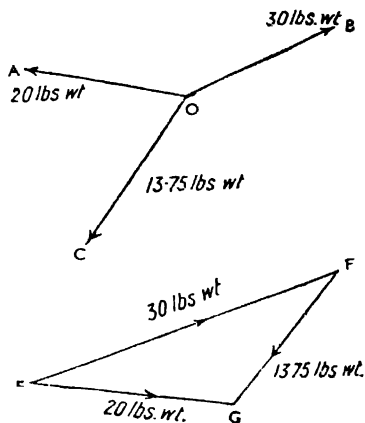
Stable equilibrium.—But if when the body is displaced very little in any direction from its E. position and left to itself it commences and continues vibrating without ever experiencing more than very small deviation from the position of E., the E. is said to be *stable*. This is the case with a pendulum, or with a sphere loaded in its lowest part.

Unstable equilibrium.—If, on the other hand, the system can be displaced in any way from a position of E., so that when left to itself it will not vibrate within very small limits about the position of E., but will move farther and farther away from it, the E. is said to be *unstable*. Thus an egg or a billiard cue standing on end presents a case of unstable E. In many cases the E. varies with the direction of displacement; but if it is unstable for any possible displacement, it is practically unstable on the whole. Thus a coin standing on its edge is in neutral E. for displacements in its plane, but is in unstable E. for those perpendicular to its plane. It is, therefore, practically in unstable E.

The conditions required for E. vary according to the number of forces and according as the forces are acting in the same plane or not. Thus two *co-planar* forces can only balance when they are equal in magnitude and directly opposed to each other. Three *co-planar* forces acting at a point will be in E. if they can be represented in magnitude and direction by the three sides of a triangle taken in order.

In the figure the forces of 20 lb. wt., 30 lb. wt., and 13.75 lb. wt. will balance, for they can be represented by the sides of the triangle EFG, EF being 3 in. long, FG being 1.375 in. long, and GE 2 in. long. Any number of *co-planar* forces acting at a point will be in E. if they can be represented in magnitude and direction

by the sides of a closed polygon taken in order. If the forces lie in one plane, but do not meet in a point, the conditions for E. are: (1) The sum of all the resolved parts of all the forces in any two directions at right angles must be separately zero; (2) the sum of the moments of all the forces



(or of their components) about any point must be zero. The condition (1) must be satisfied if there is to be no trans.; and the condition (2) must be satisfied if there is to be no rotation. If the forces do not act in one plane, we may make use of the Principle of the Virtual Work. If the points of application of the forces receive any very small displacements consistent with the mechanical connections, the total work done will be zero, when the forces are in E.

Equimultiples (from Lat. *æquus*, equal, and *multipl.*, manifold), products obtained by multiplying quantities by the same quantity. Thus 15 and 85 are E. of 3 and 17, and a^2b^2 and bc^2 of a^2c^2 and c .

Equinoctial, another name for the 'celestial equator,' which is the imaginary great circle traced by the points of intersection of the plane of the terrestrial equator and the celestial sphere. The 'equinoctial points' are the points of intersection of the ecliptic and terrestrial equator, this intersection indicating that the sun is exactly on the equator. Astronomical observers therefore choose this juncture as a convenient season to secure a uniform reckoning of time. See EQUINOXES.

Equinoctial Gales, popular superstition to which science lends no support. Winds and storms are not more prevalent at the equinoxes than at other seasons.

Equinoxes (from Lat. *æquus*, equal, and *nox*, night) are the two days in the year, March 21 and Sept. 22, when the days are equal to the nights all over the world.

Owing to the inclination of the axis, on which the earth rotates, as it journeys round the sun, the portion of its surface which is lightened by the sun's rays, the circle of illumination varies; but at the E. the sun apparently describes the equatorial circle, and exactly half of each parallel is illuminated. At the vernal E. (in March) the sun passes from S. to N., which results in the days lengthening in the N. hemisphere, and from N. to S. in the autumnal, when the days shorten.

Equisetum, genus of plants, popularly known as horsetails, belonging to the order Equisetaceae. Of the twenty species of the genus, about half are Brit. In general habit they all bear a strong family likeness to each other, all having stiff, upright, jointed stems, with whorls of little-developed leaves, those of each whorl being united to form a sheath around the stem. They have a creeping, much-branched rootstock which penetrates the ground to a great depth. The fructification is in the form of cones, each of which is borne at the end of an upright stem or branch. The commonest wild species is *E. arvense*. The rough stems of some species are used in several occupations for the purpose of giving certain woods a high polish; while the stems of other species are used for polishing metals.

Equitable Charge. An E. C. or mortgage arises either: (1) from the mortgage of an equitable as distinct from a legal interest, e.g. where a *cestui que trust* (i.e. beneficiary of an estate in real or personal property held by trustees) charges his property as security for a loan; or (2) by reason of the form of mortgage being recognised by equity and not at common law. A common law mortgage implies the conveyance by deed of the mortgagor's legal interest to the mortgagee; equity allows the creation of a charge (a) by mere deposit of title deeds, or (b) by an unsealed written agreement to deposit without actual deposit of deeds. Generally speaking, the incidents in both legal mortgages and E. Cs. are the same, but where property has been mortgaged by deed, whether before or after the creation of an E. C. on the same property, the legal has priority to the equitable mortgagee.

Equitable Estates, see ESTATE.

Equites (from Lat. *equus*, horse), horse-men or knights of anc. Rome. At first they formed part of the army. Servius Tullius increased the number of 'centuriae' (hundreds), into which they were divided, from six to eighteen. The first six were purely patrician; the latter twelve, plebeian. But beside the 'equites equo publico,' who received money for their mount from the state treasury, there were 'equites equo privato,' volunteers providing their own horse. After the second Punic war the knights exerted a political influence second only in importance to that of the senate. They farmed the provincial taxes and constituted the capitalist class. The democrat, Gaius Gracchus, used them as a foil to the aristocracy, a policy imitated without intermission up to imperial times, and guaranteed their

support by granting them control of the jury courts, as well as the revenues of Asia. Under Augustus many civil posts of honour, such as the prefecture of the corn supply, were open to them after military service. Once more, however, they became primarily soldiers instead of financiers.

Equity. In England E. is a science which in a general sense corresponds to natural justice. But as administered in the courts it has a narrower meaning as connoting merely that portion of natural justice which, crystallised into technical rules, and operating according to clear-cut principles, has found a definite place in the general legal system. The fundamental notions of Eng. E. are to be deduced from a series of leading maxims upon which the courts act in the administration of their equitable jurisdiction. These maxims are as follows: (1) E. follows the law (see below). (2) E. will not suffer a wrong to be without a remedy by reason of a merely technical defect. (3) He who seeks E. must do E. (4) E. looks to intention rather than form. (5) E. acts in *personam*, i.e. equitable rights are primarily based on the assumption that a court of E. does not, like a common law court, issue judgments to be executed by its own officers, if necessary by force, but grants decrees (*q.v.*) which the parties themselves are to execute on pain, in default of so doing, of being treated as guilty of contempt of court. (6) E. imputes an intention to fulfil an obligation. (7) E. looks on that as done which ought to have been done (see CHARITABLE USES). (8) Delay defeats E., i.e. a suitor in E. must not sleep on his rights when he knows what they are. (9) 'He who comes into E. must come with clean hands.' (10) Equality is E. (11) Where there are equal E.s. (equitable rights) the first in time shall prevail, e.g. a purchaser for value of the E. of redemption of a house takes subject to the mortgagee's interest, even though he thought there was no mortgage. (12) Where there is equal E. the law shall prevail, e.g. A mortgages his land to B by deposit of title deeds, and then without disclosing that fact executes a legal mortgage to C. If the proceeds on sale are insufficient to satisfy more than one of the loans, C. will have priority, because although he was second in point of time, he has as good an E. and the legal estate too.

In its widest sense, E. answers to the definition of justice given in the Rom. Pandects: 'The constant and perpetual wish to render every one his due.' In any system of law the general meaning corresponds to a sense of natural justice, and all the different shades of meaning which jurists have assigned to this variable term may be referred to that primary notion. These different shades have been enumerated by Austin as follows: (1) A species of interpretation of statute law, as denoting that the judges will generally construe a statutory enactment on the assumption that the legislature desired to be both uniform and consistent. (2) Judicial impartiality. (3) The mode of

formation of E. procedure or the matter whence the judges derive their equitable principles, whether natural law, international law, some standard of ethics, or a sense of justice, all susceptible of summarisation in the maxim *summum jus summa injuria* (Cicero, 'Extreme justice is often extreme injustice'). (4) Good principles of judicial legislation. (5) The cheerful performance of duties not legally enforceable. (6) Morality, positive or otherwise. (7) That portion of our law which is administered by a court of E.; and (8) rights in the nature of a set-off or counterclaim. But however variable the meaning of E. may be, in England it now connotes a body of technical principles which have been evolved in the course of centuries by successive chancellors and other E. judges (see CHANCELLOR). To follow out the hist. of the office of Lord High Chancellor and the Court of Chancery (q.v.) in England is practically to trace the growth and maturity of Eng. E. It is hardly possible to define E. as now administered in England, or to make it intelligible otherwise than by a minute enumeration of the matters cognisable in the courts in which it is administered in its more concrete and modified sense. (See as to matters assigned to the Chancery Division, under CHANCERY, COURT OF). E. in England is the very antithesis of common law (q.v.). The remedies for the redress of civil wrongs and the enforcement of civil rights were formerly always distinguished by division into two classes, those administered in courts of law, and those administered in courts of E.

Accordingly, rights may be distinguished into legal and equitable. Courts of common law formerly proceeded by certain highly technical forms of action, e.g. trespass (q.v.), trover (q.v.), detinue (q.v.), assumpsit (q.v.), and an error in the form of action was fatal; form was more than substance. But there were and, indeed, will always be many cases in which a simple judgment for either party will not do entire justice. The ordinary law courts had no machinery for such a purpose, but courts of E. adjudicated by decrees, so framed as to meet all the exigencies of the case, which varied, or qualified, the legal remedy so as to suit it to mutual and adverse claims and the substantial rights of all the parties. A court of E., therefore, always had jurisdiction in cases where a plain, adequate and complete remedy could not be had in the common law courts; and unless the common law remedy was such as to reach the whole mischief and secure the whole right of the party present or future, the courts of E. interposed and gave relief. Before the Judicature Act, 1873, the jurisdiction of a court of E. was sometimes concurrent with that of courts of common law; sometimes auxiliary to it; and sometimes exclusive. The concurrent jurisdiction was exercised in cases where the rights were purely of a legal nature, but where other and more efficient aid was required than a court of common law could vouchsafe. The most common exercise of the concurrent jurisdiction was

in cases of account, accident, dower, fraud, mistake, rectification, misrepresentation, partnership, and partition. A court of E. exercised its auxiliary jurisdiction in cases where the courts of law had no like authority. By this assistance it removed legal impediments to the fair decision of a question in issue at law, as by compelling a party to disclose documents which he makes part of his own case, and by compelling him to admit material facts on oath where a court of law was unable to enforce disclosure. The exclusive jurisdiction was exercised mainly in cases involving merely equitable rights, or rights not recognised at common law. Most cases of trust and confidence fell under this head. In particular this jurisdiction was exercised in granting injunction to prevent waste or irreparable injury; in appointing receivers of property which was in danger of being misapplied; in compelling the surrender of securities improperly obtained; in enforcing specific performance of contracts (i.e. literal compliance as opposed to damages for breach); and in supplying the defective execution of instruments by correcting them according to the proved intention of the parties. (For the manner in which a suit in the E. side of the old Court of Chancery was commenced, see under CHANCELLOR, LORD HIGH, and CHANCERY, COURT OF.) The old method of petitioning by Bill and Answer has fallen into disuse, and the proceedings in the Chancery Div. are now, like those of the common law courts, simplified as far as compatible with the circumstances of each particular case.

Since the passing of the Judicature Act, 1873, the distinction between law and E. has lost some of its importance, but the effect of that Act may easily be misunderstood if a literal fusion of the principles of law and E. be assumed. The practical effect of the Judicature Act was this: (1) It assimilated to a great extent the procedure of the Chancery Div. and the King's Bench Div. (2) It reconstructed the Chancery Court into a Chancery Div. of the High Court of Justice. (3) It fused the rules of law and E. to the extent that they are both now concurrently administered by all courts of law, whether nominally belonging to the King's Bench Div. or the Chancery Div. (4) It provided a general principle that where there is any conflict or variance between E. and common law, E. should prevail; and (5) it allocated to the Chancery Div. most of the subject-matter formerly peculiar to the old Court of Chancery (q.v.). In short, the fusion was a fusion merely of administration, the principles of E. being in no way affected; and even this fusion of administration is only partial when it is recollected that so large a number of causes and matters appropriate to the old Court of Chancery are still automatically assigned for hearing to the Chancery Div. 'The main object,' says Lord Watson in *Ind Coope & Co. v. Emerson*, 1887, 12 Appeal Cases, at p. 308, 'of the Judicature Act was to enable the parties to a suit to obtain in that suit, and without

the necessity of resorting to another court, all remedies to which they are entitled in respect of any legal or equitable claim or defence properly advanced by them so as to avoid a multiplicity of legal proceedings.'

English and Roman equity contrasted.—In England E. in its origin and development was essentially the same as Rom. E., or the system of law administered by the prætors. Both bodies of principles claimed to override the existing and stricter civil law by virtue of a supposed intrinsic superiority. There were differences, however, in material sources. In Rome the equitable jurisdiction of the prætors was referred to a specific source in the *jus gentium*, or law of nations, which the Romans regarded as nothing less than an emanation from the law of nature, a divine law harking back to an ideal past and owing its catholicity to the assumed equality of all men. In England the material source was never avowed. In point of fact the process was a surreptitious one. E. varied, according to Seldon's celebrated aphorism, 'with the length of the Chancellor's foot.' Historically it would seem that the Chancellor administered his E. with the tacit approbation of the king, such moral justification as it might have had being the assumption that the defendant in a harsh case was bound 'to purge his conscience' and do right where the common law could not compel him to do so. But phrase it as we may, both systems owed their efficacy to their expediency, their impartiality, and a natural sense of justice. Moreover, both systems had their authorisation in the royal or imperial prerogative (whether confessedly so in England or not), for in no system of jurisprudence can a judge, theoretically at least, claim to give decisions contrary to the statute law or civil law. Hence the paradox *æquitas sequitur legem* (E. follows the law). Rom. E. did, no doubt, in a far greater degree, meet social exigencies, and the fiction implied in the above maxim was far more transparent. There were differences in form, source, and manner of enunciation. Eng. E. was, and in practice now is, largely administered by an exceptional civil tribunal—the Chancery Div. Prætorian E. and the *Jus Civile* were administered by one and the same tribunal. Again, the E. of the Romans was statute law, whereas chancery law is judiciary for the most part; and finally the subjects with which each system is concerned differ widely, e.g. the urban prætor altered root and branch the whole law of intestate succession; but no Eng. chancellor would have ventured on such a revolution. The whole difference between the two systems, however, is unessential and merely historical if we regard E. objectively as a distinct system of law: it is a real difference, on the other hand, if we view it as merely the process of tempering all rigid law by principles of inherently superior fairness. See M. Garsia, *Equity in a Nutshell*, 1933; H. Hanbury, *Essays on Equity*, 1934; E. Shell, *Principles of Equity*, 1934.

Equity, Bill in, see **BILLS**.

Equivalent (of an element), see **COMBINING WEIGHT**.

Equivalents, Chemical, see **ATOMIC HEAT**.

Equuleus, a constellation, near Aquarius, in the N. hemisphere. The name means 'colt,' and Ptolemy called it 'hippopotamus.' It contains a remarkable double star (δ Equulei). After Capella it is the most rapid binary known, its period of revolution being 5.7 years. *Equuleus Pictoris* (Painter's Easel) was a new constellation introduced by Nicolas de Lacaille, 1763. It is near Canopus in the S. hemisphere, and is usually called Pictor.

Era, see **under CHRONOLOGY**.

Eran, see **IRAN**.

Erard, Sebastian (1752–1831), Fr. maker of musical instruments, constructed his first piano in Paris in 1780. During the Revolution he was in London, and again from 1808–12. He invented the harp with double pedals and the grand piano with double escapement. His instruments won high commendation from the foremost musicians of the day.

Erasistratus (b. c. 300 B.C.), famous physician and anatomist, born at Iulis in the is. of Ceos. He was the son of Cleombrotus and Cretoxene, and became a pupil of both Metrodorus and Theophrastus. About 294 B.C. he was physician at the court of Nicator, king of Syria, but he later settled in Samos and founded a school of medicine. E. discovered the difference between sensory and motor nerves, and believed the heart to be the origin of veins and arteries. His works only remain in fragments. See Hieronymus, *Erasistrati et Erasistratorum Historia*, 1790; and Fuchs, 'De Erasistrato Capita Selecta' in *Hermes*, vol. XXIX., 1897.

Erasmus, Desiderius (1466–1536), Dutch scholar and theologian, the illegitimate son of Rogerus Gerardus. He styled himself 'Rotterodamus,' a native of Rotterdam, though a contemporary document states that he was born in his father's native tn. of Gouda. He was educated at St. Lebuin's church, Deventer (1475–84), and was a chorister at Utrecht. On the death of his father in 1484, he went to a school at Hertogenbosch, and later joined a religious order in the house of St. Gregory's at Steyn, being ordained a priest in 1492. Shortly afterwards he became secretary to Henry of Bergen, bishop of Cambrai, and in 1495 entered the college of Montaigu, in the Univ. of Paris, where he won great fame as a scholar. He eked out his living by taking pupils, one of whom, Wm. Blount, Lord Mountjoy, persuaded him to visit England in 1498. At Oxford he discussed theology with John Colet and began his friendship with Linacre, Thomas More, and others, but returned to Paris to his Gk. studies in 1500. In this year he brought out his *Collectanea Adagiorum*, which contained extracts from the Classics and from the Fathers. E. travelled about the Continent considerably, teaching privately and studying wherever he went. In 1506 he went to Italy as the tutor of the two sons

of Baptista Boerio, Henry VII.'s physician. There he made new friendships with such men as Aldus Manutius, the Venetian printer, who pub. for him a new and enlarged ed. of his *Adagia*, entitled *Chiliades Adagiorum*. In Venice, Alexander Stewart, the natural son of James IV. of Scotland, at whose side he fell at Flodden, became his pupil and friend, and in Rome he was honoured by all the members of the papal circle. In 1509 he again came to London and stayed with his friend More. At this time he wrote his brilliant satire called *Encomium Moriae*, in which kings, popes, bishops, and the



DESIDERIUS ERASMUS
Engraving after a painting by G. Penn

like, all came under his lash. He now visited Cambridge, where he finished his work on the Gk. N.T., and on Seneca and St. Jerome, and where he taught Gk. and lectured on divinity. E. had now a large circle of disciples, both on the Continent and in England, who were proud to look up to him as their master and teacher. In 1511 he pub. *De Duplici Copia Verborum et Rerum*, a text-book of rhetoric, and his N.T. appeared in 1516. From 1516 to 1521 he lived chiefly at Louvain, near the court, though he not infrequently journeyed to Brussels or to Basle and in 1517 went for the last time to England. At Louvain he took an active interest in the founding of Hieronymus Busleiden's Collegium Trilingue, and there, too, he prepared his ed. of the *Christian Fathers*. About this time he formed a friendship with Johann Froben, a publisher of Basle, and in 1521 E. settled permanently in that tn. to become Froben's general literary adviser. Between 1516 and 1536 Froben's press issued a remarkable series of the *Fathers*, including Jerome (1516), Hilarius (1523), Ambrose (1527), Augustine (1528), and Origen (1536), which was largely the work of E., though he had

many coadjutors. Froben died in 1527, and two years later E. moved to Freiburg to avoid the religious dissensions that were disturbing Basle, but he returned to the latter tn. in 1533, where he died of dysentery in the following year. E. never left the Church of Rome, though he refused again and again to enlist in its service against the Reformers. The Lutherans he ridiculed in his *Diatribe de Libro Arbitrio* (1526) and Ulrich von Hutten in his *Spongia* (1523); but the papists suffered equally in his *Colloquia*, pub. between 1516 and 1536. He was accused of indifference and of wavering, but it was only natural that such a hard and sure litter should make enemies. E. was a great scholar, and had vast literary acquisitions. There are numerous Eng. trans. of his colloquies and other writings. Complete eds. have been pub. by the Froben Press, Basle, 1540, and J. Le Clerc (ed.), Leyden, 1703-6; F. M. Nichols (ed.), *The Epistles of Erasmus from his Earliest Letters to his Fifty-First Year*, 1901-18, and P. S. and H. M. Allen (ed.) *Opus Epistolarum Des. Erasmi Rotterdami*, 1906-34. See lives and studies by J. Jortin, 1758-60; R. B. Drummond, 1873; J. A. Froude, 1891; P. S. Allen (*The Aged Erasmus*), 1914; R. H. Murray (*Erasmus and Luther*), 1920; J. Hülzinger, 1924; J. A. K. Thomson (*Erasmus in England*), 1930-1.

Erastus, Thomas (1524-83), Swiss theologian, whose surname was Liebler, Lieber, or Luber, b. at Baden, Switzerland, of a poor family. He studied theology at Basle (1540), and later philosophy and medicine at Padua. In 1558 he became prof. of Medicine at Heidelberg and private physician to the Elector Palatine, Otto Heinrich. He was elected privy councillor and a member of the Church Consistory (1559), and occupied the chair of ethics at Basle in the last year of his life. E. was chiefly renowned as a theologian. At the conferences of Heidelberg (1560) and Maulbronn (1561) he upheld the Zwinglian doctrine of the Sacrament of the Lord's Supper or the view of the Eucharist as a merely symbolical ordinance, and, through the influence of the Calvinists, he was excommunicated on a charge of Socinianism. His most important work, written in 1568, pub. posthumously in 1589, was entitled *Explicatio gravissimæ questionis utrum excommunicatio, quatenus religionem intelligentes et amplectentes, a sacramentorum usu, propter admissum facinus arcel, mandato naturæ divino, an excepta sit à hominibus*, and upheld the right of the state to punish ecclesiastical offenders. Hence, 'Erastianism' is used to denote the doctrine of the supremacy of the state in ecclesiastical matters, though this was supported by Grotius rather than by E. He denied the right of the Church to inflict civil penalties, or to exercise discipline—the power of the keys—that appertaining, he maintained, to the province of the civil magistrate. E. also pub. treatises on the theories of Paracelsus and on astrology, alchemy, medicine, etc.

Erasure, or **Razure** (Lat. *radere*, to scrape or shave), the alteration or interlineation of a deed will, or other formal writing. According to Brit. law, an E. is presumed to have been made at or before execution in the case of a deed or other document. In the case of a will, however, the writing stands without the alteration, unless the witnesses have initialled such alteration and have made a note of it at the end of the will. An alteration made in a deed by a stranger without consent of the parties does not prevent its contents from having effect; if altered by a defendant, it may be given in evidence by him, but if by a plaintiff, he cannot enforce any benefit that may thereby accrue to himself. In Scotland, the law presumes that the E. was made after execution. If it is desired to make any alteration, addition, or deletion in a deed, such E. must be 'noticed in the body of writ' and must be 'subscribed by the attesting witnesses.'

Eratosthenes (c. 276-c. 194 B.C.), Gk. mathematician and scientific writer, b. at Cyrene. He was a pupil of Callimachus at Alexandria, and subsequently studied philosophy with Aristotle and Arcesilaus at Athens. About 235 B.C. he returned to Alexandria and succeeded Callimachus as chief librarian. His most famous work was a systematic treatise on geography, of which Strabo made great use. Strabo says that E.'s primary object in geography was to reform the *Map of the World*. E. invented a scientific chronology, fixing the conquest of Troy as the basis of his calculations. He also invented a 'sieve' by means of which prime numbers might be discovered. He measured the earth, and calculated that its circumference measured 252,000 stadia. His book on mathematics is lost, but fragments remain of his astronomical poems, *Hermes* and *Erigone*. See H. Tozer, *History of Ancient Geography*, 1897.

Erbium (symbol Er, atomic weight 168, atomic number 68), a metallic element of the rare earths. The rare earth metals are present in the minerals gadolinite, samarskite, euxenite, fergusonite, and cerite. It forms rose-coloured salts and a rose-coloured oxide, the former of which possess a characteristic absorption spectrum.

Ercildoune, Thomas of (*Jl.* c. 1220-c. 1297), Scottish poet and prophet, also called Thomas the Rhymer, to whom the surname Learmont has sometimes been given. From two existing charters of the thirteenth century, it appears he had lands at Ercildoune (now Earlstoun) in Berwickshire, which were given by his son to the foundation of the Holy Trinity at Soltra in 1294. He had a reputation almost equal to Merlin's as a prophet; and in the *Scotichronicon* he foretells the death of Alexander, and Wyntoun asserts that he prophesied the result of the battle of Kilblane. He also occurs in the works of Barbour, Harry the Minstrel, and Hector Boece. The old romance connected with the name of T. of E. was first attributed to him by Robert Manning de Brunne, but modern scholars have shown

that its dialect is S. in form and that the text probably dates from the early fourteenth century. It has been suggested that the extant version may be based on one actually written by Thomas, who borrowed freely from Fr. sources. See Sir J. A. H. Murray (ed.), *The Romance and Prophecies*, 1875, pub. by the Early Eng. Text Society; A. Brandl, *Thomas of Ercildoune*, 1880; J. R. Lumby, *Early Scottish Prophecies* (Early Eng. Text Society), 1870; *The Whole Prophecies of Scotland*, 1603 (reprint by the Bannatyne Club, 1833).

Erceldoune or Ercildoune, see EARLSTON. **Ercilla y Zúñiga**, Alonso de (1533-94), Sp. soldier and poet, b. at Madrid. He was attached to the train of Philip II., with whom he came to England in 1554. Soon afterwards he joined a small company of adventurers who sailed for Chile to crush the revolted Araucanians. Having suffered imprisonment at the hands of his comrades, he was released, and returned to Spain in 1562. His fame rests on his epic poem, *La Araucana* (1569-89), which has been highly praised by Cervantes and Voltaire.

Eckmann-Chatrian, the literary signature of two famous Fr. writers who collaborated in their work. Emile Eckmann (1822-99) was born at Phalsbourg and died at Lunéville. He practised law from 1842-58. Louis Gratien Charles Alexandre Chatrian (1826-90) was born at Soldatenthal, in Lorraine. He was first a teacher and afterwards a clerk in a railway office. The partnership dates from 1817, and continued till 1889. Their best known works are: *Histoires et contes fantastiques* (1849), *L'illustre Docteur Mathus* (1859), *Madame Thérèse* (1863), *Histoire d'un conscrit de 1813* (1864), *Waterloo* (1865), *Le Blocus* (1867), *Le Grandpère Lebigue* (1886). They also wrote dramas: *Le Juif polonais* (1869), *Les Iltantzau* (1882), etc. See lives by J. Claretie, 1883. and E. Hinzelin, 1922.

Erdmann, Otto Linne (1804-69), Ger. chemist, b. at Dresden; prof. of Chemistry at Leipzig Univ. from 1827. He devoted much time to the chemical analysis of indigo and other dyestuffs. His *Manual of Chemistry and Principles of Drugs* went through sev. eds. In 1827 he pub. an instructive treatise on nickel, and in 1861 a brochure on the study of chemistry, which was trans. into several languages. In collaboration with Werther, he directed the Ger. Journal of Practical Chemistry.

Erebus, in Gk. mythology, the son of Chaos, and the father of Æther (upper air) and Hemera (day) by his sister Nyx (night). The word denotes utter darkness, and is used by poets with regard to the gloomy subterranean region through which the departed shades must pass on their way to Hades.

Erebus, Mount, volcano in Victoria Land, Antarctica, discovered by Capt. (afterwards Sir James) Ross in 1841, and named after one of the vessels in the expedition. The volcano is active, and is 12,500 ft. in height. See ANTARCTIC OCEAN.

Erechtheum, a temple dedicated to the worship of Erechtheus (q.v.) on the Acropolis at Athens. The present remains, which are of great beauty, date from about 400 B.C.

Erechtheus, or **Erichthonius**: (1) An Athenian hero, the son of Hephaestus (Vulcan) and of Atthis, the daughter of Cranaus. As a child he was secretly brought up by Athene (Minerva), who concealed him in a chest which she entrusted to Agraulos, Pandrosos, and Herse. They opened the chest, though they had been forbidden to do so, and saw a large serpent twined round the body of a child. They were filled with fear and committed suicide by hurling themselves from the rock of the Acropolis. E. became king of Athens, and is said to have first introduced to Athens the worship of Athena, to whom he erected a temple on the Acropolis. He settled the dispute between Athene and Poseidon (Neptune) as to the possession of Attica in favour of the former. On his death he was placed among the stars, and his worship was celebrated in a temple called the Erechtheum on the Acropolis. (2) The grandson of the above and the son of Pandion, whom he succeeded as king of Athens. He waged war against Eleusis, and killed Eumolpus, Poseidon's son; whereupon he was slain by a thunderbolt by Zeus, at Poseidon's request. In anct. myth these two heroes were regarded as one person, but distinguished as two by later writers.

Eregli: (1) Tn. (anct. *Cyistra*) of Asiatic Turkey, situated midway between Konieh and Adana. In the neighbourhood are hot springs. It exports corn, wool, nuts, skins. Pop. 7000. (2) Also called *Benderekli* (anct. *Heraclia Pontica*), seaport in Asia Minor, on the Black Sea, about 128 m. E. of Istanbul. There are fine coal-mines in the neighbourhood, and it has a good port. Here Xenophon embarked with 10,000 Gks. on his return to Greece. Pop. 7000.

Erembodegem, tn. in E. Flanders, Belgium, on the R. Dender, S. of Alost. Agriculture and manuf. of lace and cotton. Pop. 9,000.

Eremecausis, gradual combination of the combustible elements of a body with the oxygen of the air. This process of slow combustion continually takes place when animal and vegetable substances become decomposed through exposure to the atmosphere. It differs from fermentation and putrefaction in that it cannot take place without the access of atmospheric air. The term was first used by Liebig, but is now seldom found.

Eretria (modern *Aletria*), anct. seaport of Euboea, Greece, on the Euripus, about 15 m. S.E. of Chalcis. It was of great commercial importance, and had many colonies, including the Cyclades. In 490 B.C. it was destroyed by the Persians before the battle of Marathon, for its interference in the Ionic revolt (498). During the fifth century B.C. it was subject to Athens, but regained its independence of Philip of Macedonia through its leader Phocion (354). It was the bp. of Achaëus and Menodorus. At the modern vil., sometimes known as Nea Psara, the Amer.

School of Athens carried out archaeological investigations from 1890 to 1895.

Erfurt, tn. of Saxony, Germany, situated on the Gera, 14 m. from Weimar; it is an important railway junction. The beautiful cathedral, Beate Mariæ Virginis, dates from the twelfth century. Other churches of interest are the Predigerkirche (twelfth century); the Reglerkirche, a fine example of the Romanesque style (twelfth century); the Barfüsserkerche, in the Gothic style. E. was once a member of the Hanseatic League. The old monastery of St. Augustine, in which Luther lived as a friar from 1505 to 1508, has been converted into an orphanage. The univ., at which he studied, was suppressed in 1816 and its funds devoted to the endowment of the Academy of Sciences and to the maintaining of its fine library. The palace was once the residence of the electors of Mainz. There are a municipal theatre, museum, and large library. E. before the Second World War was a flourishing industrial centre, its chief manufs. being boots and shoes, machinery, dress materials, furniture, musical instruments, chemicals, tobacco, malt, etc. During the Thirty Years' war, E. was held by the Swedes; in 1648 it was ceded to the elector of Mainz, but, refusing to submit, was forcibly taken in 1664. In the nineteenth century its fortifications were demolished and its limits extended greatly, as it developed into a busy industrial centre. The city was incorporated with Prussia in 1802. In the Second World War, in April 1945, following the trapping of Army Group B. in the Ruhr, an easy advance was offered from Kassel through E. and Leipzig to Dresden, and when this was accomplished, the Allied forces held the richest industrial area still remaining to the Gers. after the loss of the Ruhr and Silesia. E. was cleared on April 12. Pop. 165,600.

Erg (abbreviated from Gk. *ἔργον*, work), in dynamics, is the unit of energy or work necessary to overcome the force of one dyne as it acts through a distance of one centimetre. Thus the power of machinery may be measured by the number of Ergs. per second of which it is capable. It is also applied to the energy of two grams moving with a unit speed. See MECHANICS.

Ergasteria, or **Laurion**, mining tn. in Greece, 25 m. S.E. of Athens. It has anct. lead and silver mines, reopened in 1864, and cadmium and manganese are exported. Pop. 3800.

Ergeri, see ARGYRO-CASTRO.

Ergosterol, unsaponifiable part of a natural fat, sterol, so named from its occurrence in ergot of rye. Also found in yeast. It is present in very small quantities as an impurity of cholesterol found in animal cells. When irradiated by sunlight, E. in superficial tissue cells yields up the anti-rachitic vitamin D. vital to health. E. in solution, irradiated by ultra-violet rays, is used to supply deficiencies in vitamin D.

Ergot, or **Spurred Rye**, a diseased condition or fermentation of rye and of other cereals. A sweet yellowish mucus exudes

from the ears of the corn on its first appearance. The ears then lose their starch and the ovaries show a whitish tissue of the mycelium of the fungus. Bread that has been made of such infected rye often gives rise to certain nervous complaints, known as ergotism. The drug *ergola* or *Secale cornutum* is used medicinally. See C. Barger, *Ergot and Ergotism*, 1931. See also MATERIA MEDICA.

Eric, name of sev. Dan. and Swedish kings: *Eric VII.* (1412-59), the son of Duke Wratislaw of Pomerania, was b. in 1382. He succeeded Queen Margaret of Denmark, thus uniting the kingdoms of Denmark, Norway, and Sweden. The last named he lost in 1437 during the revolt of the peasants of Dalecarlia, and he was deposed from the throne of Denmark two years later. *Eric VIII.* (1155-60), called 'the Saint,' a pious Christian, fell in battle against the Danes. *Eric XIV.* (1560-68), the son of Gustavus Vasa, was b. in 1533. He was a cruel and capricious ruler, and brought much suffering upon his subjects. He limited the power of the dukes at the Arboga Riksdag in 1561, and extended his rule into Estonia. His matrimonial ambitions reached to Christina of Hesse, Mary Queen of Scots, and Queen Elizabeth of England, but he finally married Katriu, Mänsdotter, a Swedish peasant girl, who alone appears to have been able to control him in his fits of temper. He murdered the three Stures in 1567, thus causing the revolt of the nobles, who completely threw off his yoke in 1568, and elected his brother John to the throne. He died in 1571 from poison, said to have been administered by his brother. See Kruse's version of his story, *König Erich*, 1871.

Erica, the typical genus of Ericaceæ, includes more than 400 beautiful species, all of which occur in Europe, S. Africa, and the Mediterranean. The majority of these frequent the Cape of Good Hope, and are often cultivated in Brit. hot-houses; in their native land they form scraggy shrubs with little beauty, but when cultivated become extremely handsome. The plants have pendulous, bell-shaped flowers, which vary in colour from red, pink, and purple to white. There are only five Brit. species, and all require sandy peat earth and a moderately-shaded situation before they will grow. *E. cinerea* is a common plant found extensively on moors of Great Britain, while *E. tetralix*, the cross-leaved heath, is also well known. The other Brit. species, including *E. vagans*, occur only in Cornwall and in Ireland. In France the commonest heath is *E. scoparia*, a plant from which briarwood pipes are made.

Erioseem, large order of dicotyledonous plants of varied characters growing in nearly every part of the world, but avoiding tropical climates and showing a distinct preference for peaty soils. Four representative genera of the fifty are *Rhododendron*, *Arbutus*, *Vaccinium*, and *Erica*.

Ericht, Loch, lake situated partly in Inverness-shire and partly in Perthshire,

Scotland, in the dists. of Badenoch on the N., and Rannoch on the S. It lies 1153 ft. above sea-level. Its area is about 7½ sq. m., its length being 14 m., and its breadth varying from ½ m. to 1 m.; its greatest depth is about 512 ft. The lake is drained by the R. Ericht into Loch Rannoch. The neighbouring scenery is wild and rugged; the overhanging int. on the W. side of the lake is Ben Alder (3757 ft.). There is good salmon and trout fishing.

Erichthonius, see ERICHTHREUS.

Ericsson, John (1803-89), Swedish naval engineer, b. at Langhanshyttan, Wernland, Sweden. He was first employed as a draughtsman by the Swedish Canal Company (1815), but entered the army in 1820 and served for six years. From 1826 to 1839 he lived in England, where, in conjunction with John Braithwaite, he constructed a locomotive engine for the Liverpool and Manchester Railway (1829). He also invented the caloric engine (1833), a screw propeller (1836), and improved appliances for naval steam engines. In 1839 he sailed for the United States, where he became a naturalised citizen in 1848. He built the first Amer. armoured turret ship, the *Monitor*, which was launched in 1862, and fought a month later, with the Confederate ram, the *Merrimac*. E. also studied torpedo boats and sun motors and pub. *Solar Investigations* (1875), and *Contributions to the Centennial Exhibition* (1877). See life by W. C. Church, 1890.

Ericsson, Leif, son of Eric the Red, is said to have furthered the explorations made by his father in Greenland. According to a Norse saga he is said to have been blown off his course in about A.D. 1000 and found an unknown land to the W. Some say that this land included Helluland (Labrador), Markland or Woodland (possibly intended for Nova Scotia), and Vinland or New England. However that may be, other voyages followed, and apparently Norsemen got as far S. as the gulf of St. Lawrence, perhaps even farther. Eric the Red's Greenland settlement as a result, mysteriously disappeared in the thirteenth century, and only with the voyage of Columbus did Europe really discover the New World. See A. Williams, *Romance of Early Exploration*, 1904-06; J. Winsor, *History of America, Arctic Exploration and Greenland*, 1886-89.

Eric the Red, Norwegian chief who discovered Greenland in the tenth century and sent out expeditions to N. America.

Eridu, settlement of S. Iraq, near Ur. Excavations have revealed a Sumerian tower of the fourth millennium B.C. with, beneath it, earlier temples and a cemetery of brick compartments pointing S.E., also a neolithic substratum.

Eric Canal, in New York, U.S.A., connects Lake Erie at Buffalo with the Hudson R. at Albany and Troy and passes Utica, Syracuse, and Rochester. It was begun in 1817 and completed in 1825, at a cost of over seven million dollars, the construction being superintended by De Witt Clinton. The length is 361 m. and there are thirty-four locks. The original width and depth were 70 ft. by an average of about 9 ft., but much money has been

expended upon further improvement, in order to allow a shipping-way for vessels of 1000 tons and upwards, and it is now 150 ft. broad and has an average depth of 12 ft. Together with the Champlain, Oswego, and Cayuga-Seneca Canals, it constitutes the New York State Barge Canal System, which is the main route by which grain is brought to New York.

Erie City, co. seat of Erie co., Pennsylvania, U.S.A., on Lake Erie, 148 m. N. of Pittsburgh and 88 m. from Buffalo. It is situated on many railway lines. It has an excellent harbour, and is a well-built city. Its chief products are lumber, coal, iron-ore, petroleum, fish and the city's varied manufs.—foundry and machine, shop products, engines, silk goods and washing machines are shipped. One of its parks is the site of a fr. fort erected in 1749. This fort was built on Presque Isle by which the fine natural harbour is formed. Pop. 116,900.

Erie, Lake, the most southerly of the Great Lakes, forming the St. Lawrence system in N. America, lying between Canada and the U.S.A. It is bounded on the N. by Ontario, on the S. and S.E. by Ohio, Pennsylvania, and New York, and on the W. by Michigan. It is connected with Lake Ontario by the Niagara R., and with Lake Huron by the Detroit and St. Clair Rs. It is 241 m. long by 30 to 60 m. broad, its area being 9940 sq. m. It is 573 ft. above mean sea-level. Its waters are shallow, the greatest depth being 210 ft. On the Amer. side of the lake are the cities of Buffalo and Cleveland.

Erie Railroad Company operates a railway between New York City and Chicago, Illinois. It holds the capital stock of a number of subsidiary railway companies and of four coal companies. The latter are the source of much of its fuel supply, and their output forms a large portion of the coal carrying trade.

Eries, Iroquoian tribe of N. America, now extinct, who formerly occupied the E. and S. shores of Lake Erie. Their language resembled that of the Hurons. They were nearly exterminated by the Iroquois league in 1656, the survivors of the struggle afterwards joining the Senecas.

Erigena, Johannes Scotus (c. 800–c. 877), medieval philosopher and divine, probably a native of Ireland. His real name was Johannes Scotus, E. or Ierigena being an adopted surname, apparently connected with the word Erin (*q.v.*), and signifying Irishman. Nothing definite is known about his early life. About 843 he visited the court of Charles the Bald, where he became the head of the *schola palatina*. His earliest work that has come to us is *De divina prædestinatione*, which was vehemently attacked on account of its unorthodoxy, and was censured at the councils of Valence (855) and Langres (859). At the request of Charles the Bald, he then translated the writings of Dionysius the Areopagite. His greatest work was *De divisione nature*, which was described by Honorius III. (1225) as 'swarming with worms of heretical perversity'. E. argues that Universe or God is the ultimate unity of all things, and

that all things are worked out through the divine processes. Revelation or religion forms a prominent part in the divine process, while reason or *intellectualis visio* is the prime faculty of man. Haméau fixes E.'s death at about 877, the date of the death of Charles the Bald. There is a story, however, that about 882 he visited Oxford at the request of Alfred the Great and became the abbot of a monastic school at Malmesbury, where he was stabbed to death by his pupils. The complete ed. of his works was pub. by Migne in 1853 in *Patrologiæ cursus completus*, vol. cxxii. *De divisione nature* has been ed. by Thomas Gale (1861) and C. B. Schluter (1838). The *De divina prædestinatione* was pub. in Mauguin's *Veterum auctorum . . . opera et fragmenta* (1650) and his poems in L. Traube's *Poetæ Latini ævi Carolini* (vol. II., 1896). See St. René Taillandier, *Scotus Erigène et la philosophie scholastique*, 1843; T. Christlieb, *Leben und Lehre des Johannes Scotus*, 1860; and Alice Gardiner, *Studies in John the Scot*, 1900.

Erigeron, large genus of the Compositæ; most of the species are indigenous to N. America. *E. Philadelphicus* is found in the U.S.A., where it is used as a medicine, possessing stimulant and diuretic properties. *E. aceris* occurs in Great Britain, and with sev. other plants is known as fleabane; it has a strong scent which is said to keep away these insects.

Erin, anct. name for Ireland. The form was originally Eriu, of which Erinn was the dative case. Eriu later became a dissyllable, Eire. It has been suggested that the word originated from Eiro, the wife of MacCool, one of the kings reigning in Ireland at the time of the coming of the Milesians. The name gained popularity through the writings of Thomas Moore.

Erinaceus, see HEDGEHOG.

Erinite (arsenate of copper), occurring in concentric and mammillated layers, is bright green in colour, with a specific gravity of 4.0 to 4.1. It is found near Limerick.

Erinna (fl. c. 600 B.C.), Lesbian poetess, supposed to have been a contemporary and friend of Sappho. Only fragments of her poems remain, but these were held by the Gks. to rank with those of Homer. Her best-known poem is the *Distaff* which is written in a mixture of the Æolic and Doric dialects and of which only four lines remain. E. died at the age of nineteen. See the eds. pub. by J. Pellegrino, 1894, and T. Bergk in *Poetæ Lyrici Greci* (now ed., 1900).

Erinyes, see EUMENIDES.

Eriophorum, genus of Cyperaceæ, grows in N. lands of temperate climate. The Brit. species are called wild cotton, cotton-grass, or cotton-sedge, and have a sedge-like appearance. They are to be found in marshy and sedgy heaths, and the long cottony tufts of hair are sometimes used for stuffing cushions.

Eriostemon, genus of Rutaceæ which flourishes chiefly in Australia. The species are evergreen shrubs and are cultivated in greenhouses for their pretty pink and white blossoms.

Eriphia, genus of brachyurous crustaceans classed sometimes with the Xanthidae, sometimes with the Cancridae, and is closely related to *Cancer*, the edible crab. The species are found on tropical shores.

Eriphyle, daughter of Talaus, and the wife of Amphiaras the seer, who tried to escape from joining the expedition of the Argives against Thebes. E., bribed by Polyneices with Hermonia's golden necklace, betrayed her husband, and was murdered by her son Alcmaeon on his father's death in battle.



ERIPHORUM: COTTON-GRASS

Eris (Lat. *Discordia*), (Gk. goddess of strife, the friend and sister of Ares (Mars), and like him she delighted in war. She sowed dissensions among the gods, and was expelled from heaven by Zeus. It was she who, not having been invited to the nuptials of Peleus and Thetis, threw the golden apple, *detur pulchriori*, in the midst of the assembly and thus caused the jealous rivalry between Hera (Juno), Aphrodite (Venus), and Athene (Minerva). Thus she indirectly was the cause of the rape of Helen by Paris and of the Trojan war.

Eriith, urb. dist. of N.W. Kent, England, situated on the Thames, 12 m. E. of London. It was formerly an important naval station until the end of the seventeenth century. There are wharves, gun factories, and engineering works, also flour mills, brickyards, ballast works, and manufs. of oil, glue, gunpowder, etc. Pop. 33,000.

Eritrea, official name of It. colony on the African coast of the Red Sea. It extends from Ras Kasar, a cape in 13° 2' N., to Ras Demolra in 12° 42' N., a

distance of about 650 m. To the inland the Anglo-Egyptian Sudan, Abyssinia, and Fr. Somaliland form the boundaries; the boundaries towards Egypt were determined by a protocol in 1891, and towards Abyssinia by the treaties of 1889 and 1891. E. consists of a high mountainous hog's-back interposed between the Red Sea and the Sudan flanked on E. and W. by flatter regions. The mts. range up to 10,000 ft., and Asmara (the cap.) stands 7800 ft. above mean sea level. Three distinct climatic zones are found in the colony: that of the coastlands, that of the escarpments and valleys, and that of the high plateau and Alpine summits. The first one is characterised by great heat and humidity; the second has a more temperate climate, but considerable variation of temp. occurs owing to nocturnal radiation; a moderately cool climate prevails in the third zone. The flora in the zones is what would be expected from the climate, ranging from a tropical nature in the low country to temperate on the plateau. The lion, panther, elephant, camel, and numerous species of antelope are found. There are no navigable rivs. in the colony; the chief streams are the Setit, the Mareb, the Baraka, the Anseba, and the Hadass. Semi-nomadic shepherds form the pop. of the plains and foothills: Afars and Somalis are found chiefly in the S.; whilst the plateau is inhabited by Abyssinians. The nomadic tribes are largely of Arab or Hamitic stock, but include sev. tribes of negro origin. Sheep, goats, and camels are kept by the tribesmen, and the products include palm nuts and hides and some ostrich feathers. Some gold is mined in Hamasien. There are exports of salt. Pearl fishing is carried on at Massawah and the Dahlak archipelago. The prin. tns. on the coast are Massowa, Assab, and Zula; those of the interior, Asmara, Mogolo, Saganeiti, and Arrasa. The low country is suitable for pastoral purposes only, but the intermediate zone and the high plateau are well adapted for the cultivation of crops. Irrigation works were carried on, by the It., in the lower zone in order to help intensive production by It. farmer colonists. Pasture is abundant, and the pastoral pop. is partly nomadic. Massowa is connected with Asmara by railway, with Perim by cable, and with Addis Ababa by telegraph. Before the Second World War E. was governed by a civil governor who was responsible to the Ministry of Foreign Affairs at Rome. Italy took possession of the land in 1885, and it was formed into a Colony four years later. It was from E. that a great part of Mussolini's effort was directed which resulted in the capture of Adowa (Adua) and finally of Addis Ababa, and the estab. by the Act of June 1, 1936, of the new It. colony of It. E. Africa which also then incorporated E. as a State or gov. (See under ABYSSINIA). Since June 1, 1936, the dists. of Tigré, Danakiland, and Haussa, formerly part of Abyssinia, were added to E. The It. seat of gov. was Asmara, with 140,000 inhab. (40,000 It.). The religions of the native pop. are the Christian (Coptic rite)

and the Mohammedan, and there are some Roman Catholics and a few Pagans. There are 75 m. of railway from Massowah to Asmara, 64 m. from Asmara to Keren, 53 m. from Keren to Agordat and 140 m. from Asmara to Biscia via Keren and Agordat. The Its. made new motor roads from Massowah to Asmara and from Asmara to Keren, Agordat and Sabderat. Wireless telegraphy stations were opened at Asmara, Massowah, Assab, and elsewhere. The total area of E. is 64,000 sq. m. and the pop. about 810,000 (Europeans 50,000). Massowah (15,000), the chief port, has a good harbour. Other centres are Keren (11,000), where were fought the decisive battles in the Second World War campaign in E., Decameré (9000); Adi Ugri; and Agordat. Asmara was captured by the Allies on April 1, 1941 (for full details see ITALIAN EAST AFRICA, SECOND WORLD WAR CAMPAIGN IN (1941)). Thereafter E., together with the other occupied It. colonies, was administered by the Civil Affairs branch of the Army Staff, under a Chief Civil Affairs Officer with headquarters at Cairo.

The future of Italy's former empire in Africa, including E., remains to be decided by the United Nations Assembly. To help them to arrive at the facts, the govts. of France, Britain, Russia and the United States sent a commission to of inquiry on the views of the inhab. and other facts. To-day E.'s chief tns. Asmara and Massowah have an air of suspended animation. Asmara was developed by the Its. not only as a colony but a base for the invasion of Abyssinia. Now it is but a memorial to the vaulting ambition of Mussolini. So too with Massowah, where the Its. built a commercial harbour and naval base, though the port was also developed by the Amers, and used by the Brit. Navy during the World War. One use of this base was to service small vessels on their voyage from Britain to the Far Eastern theatre of war. The floating dock is still there, but the rest of the naval base is deserted and desolate. There are other evidences of It. resourcefulness, including a ropeway, said to be one of the longest in the world, to carry supplies from the port to the cap. Another link between the two tns. is a narrow-gauge railway. It. diesel trains, small single-carriage vehicles, twist and turn on this as they climb 8000 ft. in less than 4 hrs. Asmara as it now is, and Massowah, the splendid roads, railway and ropeway are all relics of the days of It. rule. On the question whether the Eritreans want the Its. to return, different views prevail. Some want immediate independence—particularly those whose opinions are voiced by the Moslem League: but it seems that even these do not really suppose that the country is ready for immediate independence and rather look to a United Nations trusteeship administered by Great Britain. The Muslim League's representatives admit that the Brit. give the people a good education and are interested in their health, whereas the It. gov., during sixty years did not do as much as the Brit. have done in only six years. Others advocate union with

Abyssinia, because the economy of E. seems to be bound up with that of Abyssinia. There is also a pro-Italy party in E. which demands a return to It. rule and this demand, too, is based on economic considerations. But of the politically-minded Eritreans, those who openly advocate the return of It. rule are probably the smallest section. These include, of course, the 27,000 Its. still in E. Not all Eritreans are unanimous in their praise of Brit. administration but most concede that the administration has been confronted by special difficulties—particularly the artificial prosperity produced by an expansionist motive. The Brit. administration has had to limit expenditure to the altered circumstances. Yet much has been done. The Brit. administration has made every effort to encourage local industries, including brewing, shoe-making, buttons, china and glassware, and matches. It has created a system of education and public health. Despite the check which it must perforce keep on the spending of Brit. taxpayers' money, the occupation of E. has cost Britain nearly £1,500,000 in the form of a grant-in-aid to the military administration between April 1941 and the middle of 1947.

Eriu, see ERIN.

Erivan, cap. of the Soviet republic of Armenia since the conquest of the short-lived independent republic of Armenia by the Bolsheviks. Situated 234 m. S.S.W. of Tiflis by rail on the edge of a hot dry plain, and dominated by Mt. Ararat. Wine is made, and fruit and tobacco are grown in the vicinity. Some manufacturing is carried on, and there is a hydro-electric station. There is an old Persian quarter and a Russian quarter, and the ruins of a sixteenth century fortress stand on a steep rock. Pop. is 112,500 of whom 56,000 are Armenians and 5000 Turks and Tartars. (2) Dist. of the Socialist Soviet republic of Armenia with a pop. of 180,000. It is noted for its wines and fruits.

Eriza, see ERZINGAN.

Erlangen, tn. of Bavaria in Franconia, situated on the Regnitz at its junction with the Schwabach, 114 m. N.W. of Nuremberg. A Protestant univ., the only one in Bavaria, is in the New Town, which is regarded as one of the best built tns. of Germany. The manufrs. for which E. is noted are hosiery, tobacco, leather, plate-glass, and there are large breweries. After the Edict of Nantes was revoked in 1685, many of the Fr. Huguenots settled here, and it is to this that the tn. owes the foundation of its success. Pop. 32,000.

Erlanger, Camille (1863-1919), Fr. composer; b. in Paris. At the Conservatoire, he was pupil of Decombes and Mathias for the piano, and of Durand and Tandon for harmony. He was in Léo Delibes' class for composition. In 1888 he won the Prix de Rome with the cantata *Velleda*. During residence in Italy he sketched out *Saint Julien l'Hospitalier* (a dramatic legend founded on a story by Flaubert), which came to be reckoned among his prin. works—composed by 1893, and performed 1896 at the Conservatoire. Operas: *Kernaria* (1897), *Le Juif Polonais* (1900),

Le Fils de l'Etoile (1904), *Aphrodite* (1906), *Hannele Mattern* (1908), *Noël* (1911), *La Sorcière*, (1912), *Cioconda* (1914).

Erlan, see CHEB.

Erlkönig, *Der*, or **Erl-King**, mythical character who appeared in Ger. literature towards the end of the eighteenth century. He is represented as a bearded giant with a golden crown, who lures little children and others to the unknown land of death. Goethe's ballad on the legend has been translated into English by Sir Walter Scott. Herder, in his *Stimmen der Völker* (1778) confuses *elle* (Danish *elf*) with *erle* (Ger. *alder*) in his trans. of *The Elfe King's Daughter*. This error was perpetuated and the Erl-King estab. as an alder writh.

Ermanric, see HERMANRIC.

Ermelo, small tn. of the Netherlands, in the prov. of Gelderland, situated 1 m. S. of Harderwijk. Pop. 6700.

Ermenonville, vil. of France in the dept. of Oise, about 7 m. S.E. of Senlis. It is noted as the place where Rousseau died. Pop. 540.

Erment, see HERMONTIS.

Ermine, name given to the stoat (*Putorius ermineus*) when it puts on its white winter coat. During the summer months the fur is a reddish-brown shading into white underneath, but in winter turns to pure white. The tail is black.

Ermine Street, old Eng. name for an ant. highway which ran from London via Lincoln to York and Hadrian's Wall (*q.v.*). It was one of some four which were traditionally said to enjoy royal protection, and it coincided in part with the Rom.-Brit. road system.

Ernakulam, tn. of India, in the Madras Presidency. It is the cap. of the native state of Cochin, and is situated on an inlet on the W. coast, opposite the tn. of Cochin, and 2 m. from it. Pop. 25,000.

Erne, or **Sea-eagle** (*Haliaeetus albicilla*), species of Falconidae widely distributed over the Old World. Its diet consists chiefly of fish, but it will also play much havoc with young lambs. In general character and habit it is much like *Aquila chrysaetos*, the golden eagle, but it is smaller, has a longer beak and fewer leg-feathers. The eyrie is built on sea-cliffs difficult of ascent, and in the early spring contains two or three white eggs.

Erne, **Lough** and **River**, situated in N. Ireland. The riv. rises in Lough Gowna, in co. Longford, and flows generally northward, through Lough Onghter until it enters Upper Lough E., which is a shallow piece of water about 13 m. long, containing numerous is. The riv. passes Enniskillen, and flows through Lough E. finally emptying itself in Donegal Bay. Lough E. is 18 m. long, is noted for its beauty, and contains trout and pike.

Ernest I. (the Pious) (1601-75), the founder of the dukes of Saxe-Gotha, was the son of John, duke of Weimar. He served with distinction in the Thirty Years' war, and in 1640 came into possession of the duchy of Saxe-Gotha.

Ernest II., **Augustus Charles John** (1818-1893), duke of Saxe-Coburg-Gotha, eldest son of duke Ernest I. was b. at Coburg.

He succeeded his father in 1844. He was the first Ger. prince to visit Napoleon III. Almost every European court received him, his position being strengthened by the fact that he was brother-in-law to Queen Victoria and the nephew of Leopold, king of the Belgians. Sev. musical works and books of travel were written by him.

Ernesti, **Johann August** (1707-81), Ger. philologist and Biblical critic, was b. at Tennstädt, Thuringia, and educated at the Saxon cloister school of Pforta and the univs. of Wittenberg and Leipzig. He was made prof. extraordinary of anc. literature at the univ. of Leipzig in 1742, prof. of rhetoric in 1756, and doctor of theology. By his erudition and manner of work he paved the way for a revolution in theology. He was the founder of the grammatico-historical school; his best work was in hermeneutics. By his influence and example he inspired men who were to be greater than himself; his numerous works include trans. of the classics, and criticisms and trans. of the Bible.

Ernesti, **John Christian Theophilus** (1756-1802), Ger. scholar, b. at Arnstadt. He pub. eds. of Silins *Italicus* and *Æsop*, and a Ger. version of the prin. works of Cicero. His *Lexicon Technologicæ Græcæ Rhetoricæ* (1795) and *Lexicon Technologicæ Romanorum Rhetoricorum* (1797) are very good works of their kind.

Ernestine Line, branch of the house of Saxe, which was founded by Ernest (1441-1488), the eldest son of Frederick II., the elector of Saxony. John Frederick, called the Charitable, lost the electorate and many of the possessions. In 1572 two sons of John Frederick II. divided the estates and formed the houses of Weimar and of Coburg. The former was divided into the houses of Weimar and Altenburg in 1603, the latter in 1592 into the houses of Coburg and Eisenach, which became extinct in 1633 and 1638 respectively. The chief of the line of Weimar died in 1605, leaving three sons; the eldest founded four branches of the family, which were re-united in 1748 under Ernest Augustine, duke of Weimar, to form the duchy of Saxe-Weimar-Eisenach. His youngest son, Ernest, duke of Gotha, died in 1675, and left seven sons, but most of the branches are extinct, and the E. L. now survives only in the houses of Weimar, Saxe-Meiningen, Coburg-Gotha, and Altenburg.

Ernie, **Rowland Edmund Prothero**, first Baron, Eng. man of letters (1852-1937), b. at Clifton-on-Teme; third son of Rev. Geo. Prothero, afterwards canon of Westminster. Educated at Marlborough and Balliol College, Oxford. Fellow of All Souls, 1875-81; proctor, 1883-84. He was ed. of the *Quarterly Review*, 1894-99; M.P. (Conservative), for Oxford Univ., 1914-19. Member royal commission on railways, 1913; on commercial and industrial reconstruction, 1916. President Board of Agriculture, 1916-19. Ennobled, 1919. His pub. include: *Pioneers and Progress of English Farming* (1887), *Life and Correspondence of Dean Stanley* (1893), *Letters and Verses of Dean Stanley* (1895), *Letters of Edward*

Gibbon (1896), *H.R.H. Prince Henry of Battenberg: a Memoir* (1897), *Letters and Journals of Lord Byron* (1898-1901), *The Poet in Human Life* (1903), *Letters of Richard Ford* (1905), *The Pleasant Land of France* (1908), *English Farming, Past and Present* (1912), *The Land and its People* (1925), *The Light Reading of our Ancestors* (1927).

Ernoldus, see ARNAUD.

Ernulphus, or ARNULF (1040-1124), Fr. Benedictine monk, was made prior of Canterbury by Anselm, abbot of Peterborough in 1107, and Bishop of Rochester in 1114. He was noted alike for his legal knowledge and his virtuous life. His mention in *Tristram Shandy* as a master of cursing is because of a curse which he mentions in his most famous work, a collection of documents concerning canonical law, etc., known as *Textus Roffensis*.

Erode, or Errood, tn. of India, in the presidency of Madras, situated about 54 m. N.E. of Coimbatore and 36 m. S.W. by W. of Salem. Pop. 23,000.

Erodium, genus of plants belonging to the Geraniaceae which grows in temperate lands. The two Brit. species are known as stork's-bill or heron's-bill.

Eros, god of love in Gk. mythology. Hesiod is the first to mention him, as one of the oldest gods, and one of the most powerful. He it is who brings harmony from chaos by uniting the elements. Chronos laid a world-egg in the bosom of Chaos, according to Orphic mythology, and from this egg sprang E. This conception of E. is an early one, and in later times he represents the god of sexual passion, and is said to be the son of Aphrodite by Zeus, Ares, or Hermes. He is a wanton child, tormenting gods and men by his arrows, and is often represented as blind. In art E. is always shown as a beautiful winged boy: his attributes are the bow and arrows, and a burning torch. For the Rom. version of E. see CUPID, and for the legend of Cupid and Psyche see PSYCHE.

Eros, name of a minor planet which was discovered by Witt at Berlin on Aug. 14, 1898. It is remarkable for the fact that it has an orbit between the earth and Mars, while every one of the other five or six hundred known asteroids lie between Mars and Jupiter. Its mean distance from the sun is 1.46 times that of the earth; but as the eccentricity of its orbit is large on those rare occasions when in opposition near perihelion, it could approach the earth to a distance of 0.16. It was therefore used for a series of experiments for determining the sun's parallax in 1900, which has taken ten years to work out. The results arrived at confirm those of Sir D. Gill, but add thereto a little more accuracy.

Erosion, Soil, see SOIL EROSION.

Erotic Literature, name given to that literature which has for its principal subject the passion of love. Human love is, of course, meant, as otherwise practically all literature would come under this heading, being inspired by love of nature, art, etc. Among the erotic poets of Greece the names of Alceus, Sappho, Mimnermus,

and Anacreon stand out as singers of passionate lyrics, whilst Callimachus and Philotas sang in a more scholastic strain. Nor must the delightful idylls of Theocritus be omitted. In Rom. times Petronius was the founder of E. L.; the poets Horace, Ovid, Tibullus, Propertius, and Catullus have all written much beautiful verse which come into this class. In France in the Middle Ages we have Canon de Béthune, Gace Brûlé, Bodel, etc., in the twelfth and thirteenth centuries; they were troubadours, and the form of their songs was by no means fixed. In the following century ballads, rondeaux, etc., were introduced, but there is not much talent until the time of the Renaissance. Then we have the voluptuously melancholy songs of Marot, the passionate lyrics of Ronsard, the spiritual strains of Louise Labé and the tender sensuality of J. du Bellay. The eighteenth century was the golden age of Fr. E. L. with such men as Gentil-Bernard, Dorat, Bernis, Antoine Bertin, A. Chénier, etc. The poetry of the succeeding century embraced too many elements to come under the head of 'erotic' work, though elements of eroticism were in it. In England the time of the Civil war and the Commonwealth produced some of our best E. L.; the lyrics of Herrick, Waller, Carew, Suckling, Lovelace, Cowley, etc., all belong to this class. Since then the same may be said as in the case of Fr. literature, though many of Shelley's lyrics might be termed erotic, and of later years much of Swinburne.

Erpenius (Latinised form of Thomas van Erpen) (1581-1624), Dutch Orientalist, who was prof. of Oriental languages at Leyden. Here he set up an Arabic printing press at his residence, and was made Oriental interpreter to the gov. His *Rudiments of Arabic*, 1620, is still one of the best books on the subject, and his *Arabic Grammar*, 1613, was for long the supreme authority. Among his translations may be mentioned his ed. of *El Meken*, 1623, and *Two Centuries of Arabic Proverbs*, 1611.

Erpetology, see REPTILES.

Erpeton, or properly Herpeton, name given to a genus of non-venomous serpents native to S. Asia.

Erratics, or Erratic Boulders (the term 'boulder' is nearly if not quite synonymous in geological terminology with the term 'erratic'), scattered blocks of rock which are found on the continent of Europe, and have evidently been removed by some agency from their original site. What this agency was for a long time employed the minds of scientists, and sev. theories were evolved. The earliest theory was that they had been dislodged from their original positions and transported by the agency of a flood; this is known as the diluvial hypothesis. This theory is now generally discredited. The next theory was brought forward by Sir C. Lyell, who thought that the transport and distribution had been effected by floating icebergs. A widespread submergence of the land of the European continent must have been necessary before this could have

occurred. This, the drift hypothesis, still finds some supporters. The third theory, that of glacial action, is now generally held as the result of the investigations which were carried out among the Alps, where such erratics abound. According to this theory E. B. are isolated masses of ore which have been borne along by ice-sheets for some distance from their original position; the ground moraine which accompanied them has been washed away in course of time. E. B., or perched blocks, as they are sometimes called, are very familiar objects in Alpine glacier dists., but are also easily recognised in regions where there is now no ice. They bear all the characteristic marks of the action of ice, such as erosion, striation, and smoothness of outline. Not only are boulders of hard rock transported by ice, but huge masses of stratified rock have been torn from their beds by the same agency. Thus large blocks of Scandinavian rocks are scattered over the plains of Denmark, Prussia, and N. Germany; the masses of chalk in the cliffs near Cromer are well known, and a mass of chalk of about 2,000,000 cub. ft. in bulk has been transported a distance of about 9 m. at Eirkenwalk. The statue of Peter the Great at St. Petersburg (Leningrad) had for its pedestal an erratic boulder hewn into shape. The boulder at Mouthey in the canton of Valais contains 7063 cub. ft., and is large enough to support a small house on the top; it is known as the 'Pierre de Marmettes.' This huge mass has been transported by the action of ice for a distance of over 30 m. down the valley. Erratic boulders are very numerous on the shores of the firth of Forth, Scotland. Other well-known examples are the fragments of Shap Granite which have been transported by land ice from the Lake District of England to various parts of the Midlands.

Er Rif, see **RIF**.

Erroad, see **ERODE**.

Erromanga, is. of the New Hebrides (q.v.), about 35 m. long and 25 broad. It is well watered and extremely fertile. It has been called 'the Martyr's isle' on account of the many missionaries who have laid down their lives there, including John Williams and James Harris, killed in 1839, George and Ellen Gordon, killed in 1861, and James Gordon, killed in 1872. Pop. about 1800.

Error, in law, is any mistake in fact, in law, or in the form of process which needs to be rectified either by the court before which the action was tried or by a Court of Appeal. Since 1875 all appeals in civil suits must be made to the Court of Appeal. In criminal procedure, an E. in the indictment may be cured by the Court which tries the case, or recourse may be had to the Court of Criminal Appeal.

Errors of Observation. The results of any determination of a physical or chemical quantity are always affected by errors due to the inaccuracy of the observation. The sources of error may be classified broadly as:—(1) Inaccurate methods; (2) defective instruments or impure materials; (3) influence of conditions;

(4) defects of the observer. Errors due to the first cause can only be detected by special investigations, but may and can be removed by a modification of the method. Instrumental defects can be detected by special tests and a correction can be applied. Thus a balance may not be correct; but a careful investigation will show how far it is inaccurate, and what correction should be applied, provided the error is not due to a lack of sensitiveness, for which no allowance can be made. Fluctuations of the weather and of the temp. may cause temporary alterations of the value of the quantities measured. In astronomy the changes of the weather will disturb the amount of refraction; and in the processes of weighing and measuring, alterations of temp. will have a very marked effect. If it is possible to do so, the conditions should be reduced to the standard value, or the conditions should be noted and the necessary corrections calculated from a knowledge of the numerical relation between the quantity required and the conditions. The errors due to the observer are of two classes: (1) Mistakes which consist in a wrong registration of the value measured. Such errors are preventable and can be detected by repetition or checking by another observer. The second class are due to the imperfections of the senses, such as defective vision, lack of ability to seize the exact instant of an occurrence, etc. The errors of an observation are usually very numerous, but they differ in their influence on the final result. Some always affect the result in the same direction (though not to the same extent) and are called *constant errors*. Others sometimes increase and sometimes diminish the result, and are called *accidental errors*. Mistakes and constant errors can be removed; and it is therefore more advantageous to give time and attention to their removal than to make an effort to allow for these errors by calculation. Constant errors can be detected by change of material, of method, of instruments, or of the observer. When the presence of a constant error has been detected, its cause must be found and steps must be taken to remove it. Accidental errors are often subdued by making a large number of observations and taking the arithmetical mean or average of the results obtained; the assumption being made that the number and magnitude of the errors in one direction are probably equal to the number and magnitude of the errors in the other direction. But this method of subduing accidental errors is not applicable to all cases; and recourse must sometimes be had to the method of least squares (see **PROBABILITY**). Many determinations of physical and chemical quantities involve subsidiary measurements. It is important that the subsidiary measurements should be made in such a way that the errors of those measurements have the least effect on the final result. Thus in experiments involving the use of a tangent compass or galvanometer the error in making a reading will have the least influence on the result if the deflection is about 45°.

Erse, corrupted form of 'Irish' which was applied to the Gaelic dialect of the Highlanders by the Scottish Lowlanders. In the eighteenth century E. was used to signify the Gaelic of the Scots, now it is used more for the Irish Gaelic. An attempt has been made in recent years to revive the use of E. or Gaelic in Éire, the language being taught in the schools and used officially. See also GAELIC LANGUAGE AND LITERATURE.

Erskine, Ebenezer (1680-1756), founder of the Secession Church in Scotland, b. in Berwickshire. He was preacher at Portmoak in Kinross-shire from 1703. After taking part in the Marrow Controversy on the evangelical side, he was transferred to Stirling in 1731. With three others he was suspended in the patronage dispute for upholding the right of the people to choose their own pastor. He was deposed in 1734, and although the sentence was recalled, he would not return, and was finally deposed in 1740. Before this he had formed the Associate Presbytery, the origin of the Secession Church, in 1733. The latter was split up in 1747 into Burghers and Anti-Burghers, of which E. headed the former.

Erskine, Henry (1746-1817), famous Scottish lawyer, b. at Edinburgh, was the second son of the earl of Buchan. After a distinguished career at the Bar he became Lord Advocate. In politics he was a very earnest Whig, and it was owing to his influence that many useful legal reforms were brought about. He was noted both for his wit and his oratorical powers.

Erskine, John, of Dun (1509-91), Scottish reformer, son of the laird of Dun, Sir John E.; was educated at King's College, Aberdeen. He was obliged to go abroad in 1530, having accidentally caused the death of a priest, and there he came under the influence of the Reformation. The reformers Wishart and Knox were his personal friends, and all through the reign of Mary Queen of Scots, and part of the following, E. was a leading man and a reconciling influence in the religious quarrels of the time. He held the office of superintendent of the Reformed Church of Scotland for Angus and Mearns from 1560 to 1589, and was sev. times elected moderator of the General Assembly, although a layman. He was a member of the King's Council from 1579, and aided in the compilation of *The Second Book of Discipline* in 1578.

Erskine, John (1695-1768), eminent Scottish jurist, was called to the Bar in 1719. After a distinguished career there he was made professor of Scots law at the Univ. of Edinburgh in 1757, and held this post till 1763, when he resigned. His two prin. works were very famous, and are still amongst the authorities on Scots law; they are the *Principles of the Law of Scotland*, 1754, and the *Institutes of the Law of Scotland*, 1773. He d. at Cardross, near Dumbarton.

Erskine, Thomas, first Baron Erskine (1750-1823), lord chancellor, served at sea, first as midshipman and then as lieutenant, from 1761 to 1767, when he retired from the senior service and pur-

chased a commission in the 1st Royal Regiment of Foot. Returning to England in 1772, he, at Lord Mansfield's suggestion, studied law. Six years later he was called to the Bar, and at once achieved a great success. So high was his reputation that within eighteen months of his donning wig and gown he was selected to represent Adm. Lord Keppel on his trial by court-martial, when the sailor was acquitted on all counts. In 1783 he took silk, and within eight years was earning £10,000 a year, the greatest income hitherto made by any lawyer. He it was who first refused to go on circuit except for a special fee—a practice since followed by all leading men at the Bar. He entered Parliament in 1783, but lost his seat in the following year. He was, however, again returned to Westminster in 1790, but was too much occupied with his professional duties to take an active part in the proceedings of the House. In the Grenville administration (1806) he became lord chancellor, and he was one of the commissioners appointed to inquire into the charges brought against the Princess of Wales. He retired with the ministry in the next year, and did not again hold office. As lord chancellor his ignorance of the law of equity militated effectively against his success in that great office. In 1820 he took an active part in securing a fair trial for the queen. For his biography, see J. C. Campbell, *Lives of the Lord Chancellors and keepers of the Great Seal*, 1815-69.

Eruptive Rocks, see IGNEOUS ROCKS.

Ervine, St. John Greer (b. 1883), playwright, journalist, dramatic critic, and novelist, b. in Belfast; manager of the Abbey Theatre, Dublin, 1915. A vigorous and controversy-loving dramatic critic, with no love for the standards of commercial theatre managers. His two Irish domestic tragedies, *Mixed Marriage* (1911) and *John Ferguson* (1915) had a fair measure of success, especially in America. Both these plays, powerful and moving, reveal good character drawing, though a strain of hopelessness runs through their picture of the invincible and devastating stubbornness of men in the grip of religious and political "convictions" (A. C. Ward, *Twentieth Century Literature*). Wrote also *Jane Clegg* (1911), a play based on his own novel of the same name, *Anthony and Anna* (1928), *The First Mrs. Fraser* (1929), *Robert's Wife* (1937), and *Private Enterprise* (1947). Novels include *Changing Winds* (1917), *The Foolish Lovers* (1929), and *The Wayward Man* (1931). He has written political sketches, of *Parnell* (1925), and *Sir Edward Carson and the Ulster Movement* (1927). He is dramatic critic of *The Observer*.

Erymanthus, high mt. of Greece, situated in Arcadia, 20 m. S.S.E. of Patras. It is now named Olonos, and is about 7320 ft. in alt.

Eryngium, genus of umbelliferous plants, occurs in tropical and temperate lands, and consists principally of perennial spiny herbs with flowers in dense heads. *E. maritimum*, the sea-holly or Eryngo, is a native of sandy sea-shores of

Europe, and is found in Great Britain; in England it bears the additional names of sea holver and sea holme. The root is candied as a sweetmeat, and has been used in medicine as a tonic and diuretic.



ERYTHRINA CRISTA-GALLI

Erysimum, genus of cruciferous plants, contains herbs with many-flowered racemes, all of which flourish in Europe, Asia, and round the Mediterranean. *E. cheiranthoides*, the worm-seed or treacle-mustard, occurs in Britain, and bears numerous small yellow flowers. Formerly used as a remedy for intestinal worms.

Erysipelas, see SKIN—Diseases.

Erythema, superficial, non-infective inflammation of the skin, with characteristic redness, disappearing when pressure is made by the finger or a piece of glass, and promptly re-appearing on removal of pressure. The first cause of E. is dilatation and accumulation of blood in the minute vessels of the skin. It may be due to local causes, as heat or cold, friction, accumulation of sweat, or other local irritants; the result of changes in the blood vessels themselves; to substances absorbed through the alimentary canal, such as special articles of diet, and other causes of alimentary toxæmia. After the condition has lasted for some time, pigment is deposited in the skin, and the colour due to this does not disappear on pressure. E. is seen as an accidental complication in fevers, particularly smallpox, measles, scarlet fever, typhus, typhoid, and cholera. The treatment of E. itself consists in the application of spirits, or other cooling lotions, powders, or a bland ointment. The appearance of E. is very variable, both in different individuals and in different parts of the body. *Erythema nodosum* is a special condition, with red, oval, raised spots, chiefly on the lower extremities. The lumps are painful, and run their course in from two to four weeks. Although painful, they do not suppurate or burst, and are most common in young persons of delicate physique. Rheumatism is a common cause, and should be treated as such.

Erythraea, genus of Gentianaceæ, inhabits dry sandy places of temperate lands. *E. centaurium*, the lesser or common centaury, is found in Britain by the waysides and edges of fields.

Erythrina, leguminous genus of tropical trees and herbs, with bright red flowers and frequently with prickly stems. *E. Caffra*, the Kafirboom, produces a good timber.

Erythronium, see DOG'S TOOTH VIOLET.

Eryx, genus of oviparous snakes, closely allied to the genus *Boa* in the family Boidæ, but the species of E. differ from those of *Boa* in having a very short obtuse tail and narrower ventral plates. They occur in Asia and Africa.

Eryx, name of a high mt. of N.W. Sicily, and now named Mont St. Giuliano. A temple of Venus once was on the summit, whence the goddess was called Erycina.

Erzberger, Matthias (1875–1921), Ger. politician, who came into prominence during the First World War. In his earlier years he took up teaching and journalism. Entered Reichstag 1903. During the First World War worked for peace and as Secretary of State conducted the Armistice negotiations on Germany's behalf with the Entente, the terms of which he signed. In 1919 became Finance Minister in new republican gov. He brought an action for slander against Dr. Helfferich, and during the course of the trial he was wounded by an assassin. Erzberger's power in politics was based upon his being the mouthpiece of the Catholic working class. His articles in the Press aroused great animosity against him in his political opponents, and this led to his assassination on Aug. 26, 1921. One of his assassins, Heinrich Tillessen, was arrested in 1946 by the French authorities and sent for trial before a Ger. judge at Freiburg-in-Breisgau, but, although he admitted his guilt, he was acquitted, the court upholding the legality of the amnesty declared by Hitler in 1933. Protests at so dangerous a precedent were sent by Ger. professional organisations to the Fr. military Gov. at Baden-Baden, and the Fr. authorities announced that they would re-try Tillessen. Others implicated in the murder were said to be von Killinger, Ger. ambas. in Bucharest and a leading Nazi; and a man named Schulz, who was sent for trial in 1946 at Wiesbaden.

Erzerum, **Erz-Rum**, or **Arzerum**, vilayet and tn. of Asiatic Turkey, 110 m. S.E. of Trebizond, occupying the centre of the Armenian plateau. The country (pop. 395,800) is mainly agric., though salt and coal are found; there are iron, saline, and sulphur springs. An extensive trade in cattle, horses, mules, furs, wheat, etc., is carried on. The tn. has a citadel, founded about A.D. 415 by the Emperor Theodosius the Younger, many mosques and former Dervish monasteries; the former industries have declined; there is petroleum in the vicinity. The chief industries are iron and copper working. In 1517 it was acquired by the Turks, and the Russians took it in 1829 and 1878

respectively, but by the Treaty of Berlin it was restored to Turkey. During the 1914-18 War E. was seized by the Russians in Feb. 1916 in their campaign against the Turks. After the Russian revolution the Turks recaptured the place in March 1917. In June 1919 a provisional gov. was set up at E. by the Nationalist party, headed by Gen. Mustapha Kemal Pasha (late Atatürk (q.v.)). Pop. 32,000.

Erzgebirge (meaning ore mountains), chain of mts., which separate Bohemia and Saxony. It extends about 120 m., at length meeting the Riesengebirge range. On the N. slopes there are fertile valleys; the central part of the chain forms a plateau, while the S. slopes are very steep, in some places almost perpendicular. The highest summits are the Fichtelberg, nearly 4000 ft., situated in the N.E., and the Keilberg, over 4000 ft., in the S.E. Between these stands (Gottesgab), the most elevated tn. in Bohemia. The geological formation of the chain is gneiss, granite, and clay slate. It is especially rich in ores: lead, silver, copper, tin, mercury, gold, and iron abound, also quantities of sulphur, bismuth, cobalt, arsenic, coal, etc. There are sev. holiday resorts among the heights, such as Bärenfels, Kipsdorf. Following the loss of Jena and Erfurt (q.v.) in April 1945, the Gers. retired S.E. into the E. along the frontier of Czechoslovakia, although they still clung to the tn. of Chemnitz as a pivot to the N., where the South Saxon armies were still putting up a stiff resistance to the Amer. First Army. On the central Ger. front, although elements of the allied forces continued to push forward to meet the Russians at Torgau, it was necessary to halt the main allied forces on the lines of the Elbe, and Mulde through the E.

Erzingan, Erzincan, or Eriza, tn. of Turkish Armenia, situated on the Kara Su, or the W. upper branch of the Euphrates, about 80° m. W.S.W. of Erzerum, exports fruit, sheep, oxen, and horses. It was taken by the Russians on July 26, 1916. There are frequent earthquakes. In those of Dec. 1939 which occurred over much of E. and N. Anatolia, E. was for the most part destroyed and 10,000 persons are said to have perished. The reconstruction of the tn. was begun soon afterwards slightly N. of the old tn. Pop. (tn.) 25,000; (vilayet) 171,800.

Esau, son of Isaac and Rebecca, and elder twin brother of Jacob. His name signifies 'hairy' (Hebrew), and he was so called because he was red and hairy at birth. In Gen. xxv. is given the story of how he sold his birthright to his brother Jacob for a 'mess of red pottage,' and Gen. xxvi. relates the story of how Jacob impersonated the hairiness of his brother and succeeded in deceiving his blind father, thus gaining the blessing intended for the first-born. E. became a hunter, and eventually the leader of a tribe inhabiting Mt. Seir, S. of the Dead Sea.

Esbjerg, seaport in Denmark on the N. Sea, on the W. coast of Jutland. A harbour was constructed here in 1868 to give

Jutland an export haven in place of Schleswig-Holstein, lost in 1864, and to this it owes its rapid rise. It has valuable fisheries, and is an important export centre, chiefly for fish, eggs, bacon, and cattle. Pop. 43,200.

Escalators, moving stairways for transport of passengers. Owing to the fact that stairways can carry more passengers an hour than lifts, Es. are rapidly taking the place of lifts on underground railways. The E. consists of a number of steps fastened to an endless belt which follows the incline of the stairway. Each step consists of a separate small trolley running on four rollers, which are staggered at the angle of the stairs: the top of the trolley consists of an inverted L-shaped step, which sinks to level at the top and bot-



ESCALATORS

One of the standard types of escalators in use on London's Underground system, showing three staircases

tom of the stairway. A hand-rail travels round at the same speed as the stairs and is of flexible composition. Powerful electric motors work the moving stairways and self-operating brakes are fitted to meet the possibility of a sudden breaking of a coupling or of a gear wheel.

Escallonia, genus of Saxifragaceae, consists of about fifty shrubs with alternate evergreen leaves and red or white flowers. All the species inhabit S. America, on the high grounds especially in Alpine regions, while a few, e.g. *E. rubra*, a species of wild currant, are cultivated in Britain.

Escanaba, co. seat of Delta co., Michigan, U.S.A. It is situated on a promontory at the mouth of the R. Escanaba, on the little bay de Noquette, 60 m. S. of Marquette. It has an exhilarating climate and is a summer resort and touring centre. It possesses a good harbour and commodious docks and ships six million tons of iron ore annually. The

fisheries and manufs. are important. Lumber and furniture are exported. Pop. 14,800.

Escapement, see under HOROLOGY.

Escar, see ASAR.

Escarpment, see GEOLOGY.

Escart, see SCHELDT.

Esch, or **Eschan der Alzette**, tn. situated in the grand duchy of Luxembourg, with coal and iron mines. Pop. (1939) 22,000.

Eschalot (botanica), the shallot—*Allium ascalonicum*. An onion-like plant allied to garlic but much milder in flavour and used in making pickles. Said to have been brought down from Ascalon in Syria by the Crusaders.

Eschatology, derived from two Gk. words, meaning 'last' and 'a discourse.' This is the term under which the doctrines of Christian theology are grouped, concerning the four last things, Death, Judgment, Heaven, and Hell. E. was in existence among all the great nations of antiquity, dark and ill-defined, as in the Greek, and elaborate as in the Egyptian religion, and with it grew up, more or less definitely, the idea of retribution. Protestant E., however, is generally confined in practical discourses to a consideration of the Return of Christ, Resurrection of the Dead, the Last Judgment, and the Final Recompense. Speculations regarding the after-life were prevalent among the anc. peoples, but the Christian teaching has its roots in the O.T. and the apocryphal and apocalyptic literature. The chief religious parties who do not recognise eternal punishment as a scriptural doctrine are treated as UNIVERSALISTS (q.v.) and CONDITIONAL IMMORTALITY (q.v.), and the question of an intermediate state at PURGATORY (q.v.). The trend of recent theology is towards an attitude of reserve on the subject, and some schools prefer to speak of the 'Christian hope' rather than of E. Eschatological speculations are to be found in More's *Utopia* and Plato's *Republic*. See S. D. Salmond, *Christian Doctrine of Immortality*, 1901; E. Dobschütz, *Eschatology of the Gospels*, 1910; A. Schweitzer, *The Quest of the Historical Jesus*, 1911; F. Bennet, *E.specto*, 1926; G. Dennis, *The End of the World*, 1931.

Escheat (Fr. *echoir*, from Lat. *cadere*, to fall or happen). This term is applied to an incident of feudal tenure whereby, when there was no tenant qualified to perform the services, land reverted or fell back to the lord. In theory, at all events, there is no such thing as absolute ownership of real property, the most extensive estate one can possess being looked upon as a subordinate estate, held of a superior landlord, to whom it will eventually return. Up till 1870 E. took place in England when the tenant was convicted of a cap. felony, but after that date this kind of E. was abolished. E. still takes place for want of next of kin when the owner of land dies intestate.

Eschenbach, see WOLFRAM VON ESCHENBACH.

Eschscholtz, or **Escholtz Bay**, name of an inlet of Kotzebue Sound, situated in

Behring Strait, Alaska. Through this passes the parallel of lat. 67° N., which is the Arctic circle boundary.

Eschscholtzia, genus of beautiful yellow-flowered plants, belongs to the order Papaveraceae. The species are natives of N. America, but they are frequently cultivated as border plants in Britain; two of these are *E. crocea* and *E. californica*. The fruit has an explosive mechanism.

Eschwege, tn. in Hesse, Germany, has industries, including coal, iron and zinc mining, rolling mills, cable works. Pop. 26,000.

Eschweiler, tn. of Rhineland, Germany, situated 8 m. to the N.E. of Aachen. It possesses valuable coal-mines, and is an important manufacturing tn., being the seat of large iron-works, tanneries, breweries, etc. In the Second World War an allied offensive, launched on Nov. 16, 1944, eastward from Aachen towards E., brought about the fall of that tn. Amer. troops penetrating into it on Nov. 21. It fell after heavy fighting on the next day. Pop. 28,000.

Escobar y Mendoza, Antonio (1589–1669), Sp. churchman and writer. Educated by the Jesuits, at the early age of fifteen he took the habit of that order. He was famous as a preacher. His writings, which fill forty folio vols., belong to the field of moral theology, and were not popular with Catholics, who considered they tended to inculcate a loose system of morality. His statement that purity of intention may be a justification of actions which are contrary to the moral code and to human laws was much ridiculed in France by Molière, Boileau, La Fontaine and Pascal.

Escoffier, Auguste (1847–1935). Fr. maître-chef, began his culinary career in his uncle's restaurant in Nice. Later he was in the service of a Russian Grand Duke, and then *chef de cuisine* to the general staff of the Rhine Army in the Franco-Prussian War, 1871, and to Marshal MacMahon at the Champs Elysées. His career in England began after he had left the Grand Hotel, Monte Carlo, to accompany Mr. Ritz to the Savoy, London. The acme of his career was reached at the Carlton, and to him belongs the credit for inventing the *bombe Nero* or flaming ice, *entremets fraises à la Sarah Bernhardt* and *pêche Melba*. Wrote *The Guide Culinaire* (1903) and *Ma Cuisine* (1934).

Escorial (Sp. from *escoria*, slag; from Lat. *scoria*, slag), the place of ashes, celebrated monastery and palace in Spain erected by King Philip II. in gratitude to St. Lawrence, on whose day (Aug. 10, 1557) the victory of St. Quentin was gained. The E. stands 2700 ft. above sea-level, and is built of solid granite. It is designed to resemble the famous gridiron on which St. Lawrence was martyred. It was begun in 1563 and finished by the famous architect Herrera in 1584. It has numerous rooms and passages, mostly gloomy and small, but the chief attractions are the magnificent church, royal palace and tombs, monastery and college. There is also a valuable library. In 1808

the E. was plundered by the Fr., and it has been frequently visited by fire and lightning, so that it has been many times repaired and added to, but it still stands as a monument to its original builder.

Escosura, Patricio de la (1807-78), Sp. novelist and poet, b. in Madrid. He wrote sev. plays of very unequal merit, amongst which may be mentioned: *Barbara de Blomberg, Las Flores de Don Juan*, and *El Tio Marcelo*. His best-known novel is a tale of Philip II., entitled *Ni Rey ni Roque*.

Escrow, see **DEED**.

Escuage, or **Seutage** (Lat. *scutum*, shield), in feudal times, was a tax of a pecuniary nature, frequently levied by the crown as a substitute for the personal service of a knight or vassal. This tax was first exacted in 1159 and was restricted by Magna Charta. It was quite usual for a knight to pay this fee by way of compensation for his personal service.

Esouintla, tn. of Guatemala, situated 30 m. S.W. of the city of Guatemala, with which it has railway communication. It is the cap. of the dept. of the same name, carries on a considerable trade, and is a popular winter resort. Pop. 14,000.

Esculapius, see **ÆSCULAPIUS**.

Esculle (*Æsculle*) **Acid**, acid obtained from the bark of horse chestnut (*Æsculus Hippocastanum*) and similar trees.

Escutcheon (Fr. *écusson*), in contradistinction to *écu*, an ordinary shield, this term, in heraldry, signifies the shield on which arms are painted. The term inescutcheon is used to denote a shield charged upon the E. either as an ordinary charge or as an augmentation of honour. An inescutcheon of pretence or *en surtout* is placed in the centre of an E. and is charged with the arms of an heraldic heiress married to the bearer of the E.

Esdraelon, or **The Plain of Jezreel**, noted plain of Palestine, lying to the S.E. of Acre. It is bounded by Mt. Carmel on the W., Gilboa on the S.E., and the Galleian highlands on the N., and stretches across central Palestine with an average width of ten or twelve miles, forming a break between the mts. of Galilee on the N. and those of Samaria on the S.; it is exceedingly fertile and capable of a high state of cultivation. The R. Kishon waters the plain, which in the spring is clad in a mass of verdure. Many battles have been fought here, both in ant. and modern times, including those which ended in Lord Allenby's victories over the Turks in 1918.

Esdras, **The Books of**. There is considerable confusion as to the nomenclature of the various Ezra books. According to the A.V., the First and Second Books of Esdras appear among the apocryphal books. According to the Septuagint Version, the First Book of Esdras appears as Esdras A, while under the heading Esdras B appear the canonical books of Ezra and Nehemiah. Through the influence of Jerome, this arrangement was not followed in the Vulgate. Here the Book of Ezra is styled Esdras I.; Esdras II. is the Book of Nehemiah, while Esdras I. and II. are re-named Esdras III. and

IV. The date of Esdras I. is probably the second century B.C. It is a compilation consisting of: (1) Trans. of part of Ezra, (2) part of Nehemiah, (3) part of Chronicles, and (4) an original portion giving the discussion of Darius and the three young men. The trans. is free and in superior Gk. to that of Esdras B in the Septuagint. The Second Book of Esdras, the most pathetic of the Jewish apocalypses, dates from the last years of the first century A.D. It contains sixteen chapters, of which ch. i., ii., xv., xvi. are later additions, the first two chapters certainly being by a Christian author. The rest of the book tells of seven visions shown to the prophet Ezra, the whole being in the extreme pessimistic tone of the school of Shammai. It is not yet settled in what language Esdras II. was originally written. It now survives only in versions in Lat., Syriac, Ethiopic, etc. See C. Torrey, *Ezra Studies*, 1910.

Esh, tn., Durham, England, situated on a height 4 m. N.W. by W. of that city. There is a famous college of St. Cuthbert for the training of Rom. Catholic priests, which contains a fine library and museum. E. colliery is in the vicinity. Pop. 11,000.

Esher, vil. and urban dist. in co. Surrey, England, about 15 m. S.W. of London. A 300 year-old clock is keeping good time in the church. To the east of the vil. is Claremont, built by Clive of India. It was purchased in 1816 as a residence for the Princess Charlotte on her marriage with Prince Leopold of Saxe-Coburg, and she died there on Nov. 6, 1817. Her husband, who became king of the Belgians in 1831, transferred his rights to the Crown. Louis Philippe, the exiled Fr. king, died there in 1850, and his queen in 1866. Cardinal Wolsey once lived in a mansion built here by Wm. of Waynflete, bishop of Winchester (1447-86), of which the gateway remains. Sandown Park race course adjoins the station. Pop. 17,000.

Esher, Reginald Balliol Brett, second Viscount (1852-1930), son of first viscount, to whose title he succeeded in 1899. In 1903 he became Chairman of the War Office Reconstitution Commission. He acquired some distinction as a writer, having pub. *Footprints of Statesmen* (1892), *The Correspondence of Queen Victoria* (1907), *The Tragedy of Lord Kitchener* (1921).

Esher, William Balliol Brett, Viscount (1815-99), Eng. lawyer, b. in London, son of the Rev. Joseph Brett of Chelsea. Educated at Westminster and Caius College, Cambridge. Called to the Bar in 1840; became a Q.C. in 1861. In the House of Commons he was prominent in promoting bills relating to the administration of law and justice. As a justice of the Court of Common Pleas he provoked criticism for some of his sentences in strike cases. On the reconstruction of the Court of Appeal he was made a Lord Justice. Succeeded Jessel as master of the rolls (1883). Retired from the bench in 1897, when he was created a viscount. The Solicitors Act of 1888, which enhanced the powers of the Incorporated Law Society owed much to E.'s influence.

Esibomvu ('red soil'), new township for natives on the veld, 29 m. from Bulawayo, S. Rhodesia. A wide street has been built and sev. buildings have been completed in the business area, together with dwelling-houses. Another area has been set aside for secondary industries, including tanning, boot making, and furniture. Around the township are 2-ac. plots for crops and vegetables.

Eshowe, or **Ekwowe**, or **Echowe**, small tn. of Natal, S. Africa, situated about 30 m. N. of the estuary of the R. Tugela, overlooking the Indian Ocean. There are sev. hotels and the remains of the old fort where Col. Pearson was shut up by the Zulus. Pop. (white) 1000, (others) 1800.

Esk, name of numerous Scottish and Eng. rvs. Among the chief are: (1) The N. Esk flowing through Kincardineshire and Angus, Scotland, rising near Edzell, and flowing into the North Sea, 4 m. from Montrose; length about 30 m. (2) S. Esk, rising in the Grampians, flowing through Strathmore to Montrose harbour, with Brechin and Montrose on its banks; length about 50 m. (3) A riv. of Dumfriesshire, formed by the confluence of the Black and the White R. in Eskdalemuir, flowing 35 m. to the Solway Firth, near Sarkfoot. (4) Two small streams, N. and S. Esk, rising in Peeblesshire, and flowing through Middlebie. They unite at Dalkeith, flowing into the firth of Forth at Musselburgh. The N. branch passes Roslin Castle, Hawthornden, Habbie's Howe, Melville Castle; the S. branch, Dalhousie Castle and Newbattle Abbey.

Eskdale, valley of the Cumberland Esk, England, which rises between Scutell Pikes and Bowfell, forms the Esk Falls at Throstlegarth, turns W. at Butterket below Hardknott Castle, and flows between Muncaster Fell and Birkby Fell to Ravenglass. From Ravenglass a narrow-gauge railway runs up the valley to Dalegarth. At the head of the valley are Scutell (3162 ft.) and the three Scutell Pikes (3210 ft.). Part (586 ac.) of the valley is owned by the National Trust and part (827 ac.) is protected against afforestation or other development, so that all the upper part of the valley is preserved.

Eskdalemuir, par. of Dumfriesshire, Scotland, about 12 m. from Langholm. There is a National Magnetic Observatory to replace the one which was formerly at Kew. Pop. about 400.

Eski-Djuma, tn. in Bulgaria. It lies 18 m. W. of Shumla. The inhab. breed silkworms and make pottery. Pop. 12,000.

Eskilstuna, tn. in Sweden, 57 m. W. of Stockholm. Sometimes called the Sheffield of Sweden on account of its iron, steel, and copper works. Pop. 13,500.

Eskimo, or **Eskimaun** Indians (commonly called **Eskimos** or **Uqumonds**), race dwelling in the N. coasts of America, from Labrador to Mt. St. Elias, and also occupying Baffin Land and the shores of Greenland. They are known as Innuits, a word signifying 'man' in their own tongue; the word 'Esk.' being said to be a term of reproach meaning 'eaters of raw meat,' applied to them by some Indian

neighbours, the Algonquins, living S. of them. The Es. are a race of the yellow type, but of a lighter colour than the Algonquins and rather smaller in stature. Their sustenance is chiefly derived from the capture of seals, which are their staple food and very valuable to them in numerous other ways, supplying them with dog-food, boots, clothing, tents, light, heat, and harpoon lines. They also procure food by pursuing the chase on land and by fishing. The *kayak*, a small slim boat for one man, is their most interesting and best-known invention for hunting. Its framework is covered with skin, and with



New York Times Photos
ESKIMO WOMEN

the waterproof jacket worn by the man, completely protects him from the waves, so that even if he capsizes he is able to rise unhurt by means of his paddle. The dogsledges is in use everywhere amongst the Es., except by those in S.W. Greenland, and the E. dog is admirably adapted for transport by sledge, being strong and powerful. The Es. are a cheerful and generous race, and are friendly and hospitable to strangers. Their pastimes are athletic sports and dramatic entertainments, and their children mimic the elders on a small scale. Their dwellings are of two kinds, tents for summer, and houses or huts for winter use. The tents are generally made of sealskin; but the winter dwellings are usually built of stone, covered with moss and banked up with snow, the entrance consisting of a

long passage, only high enough to admit a man crawling on hands and knees; indeed, in some parts, N. Alaska, for example, the huts are half under ground. Some of these winter dwellings shelter as many as forty or fifty persons. The E. men and women are clad alike in trousers of seal or deer skin, according to the season, and in a loose-fitting shirt, surmounted by a hood, which is enlarged for women and children. The Es. are very ingenious in their manufs., and during the long winter days indoors the men make carvings of walrus ivory, horn and wood, for use as well as ornament. The women spend most of their time in making the clothing and tents. As to the religion of the E., he believes all things to be ensouled, and spirits innumerable to abound everywhere. The E. pop. of Canada is about 7200. See F. Nansen, *Eskimo Life*, 1893; V. Stefansson, *My Life with the Eskimos*, 1913; E. M. Weyer, *The Eskimos: their Environment and Folkways*, 1933; R. Finnie, *Canada Moves North*, 1942, 1948. A. Gilberg, *Eskimo Doctor*, 1947. See also AMERICAN INDIANS; GREENLAND; RASMUSSEN, K. J. V.; THULE.

Eskimo Dog, sledge-dog used in the Arctic regions. It is broad chested, with a stout, thick neck, erect ears, and long, sharp muzzle, not unlike the grey wolf of the prairie. It is only half domesticated, and does not bark, but howls like a wolf. E. Ds. have a great deal of staying power; they are rarely fed by their Eskimo masters, which perhaps accounts for their sharp uncertain tempers. There are two breeds, the Ostiaks and the Samoyeds. The former is wolf-like, but the latter is entirely white and resembles a large Pomeranian.

Esksehir, tn. in Asiatic Turkey, connected by rail with Scutari, and the centre of the Anatolian Railway system. It has celebrated warm springs and valuable deposits of meerschaum in its immediate vicinity, pipes of the material being manufactured in the tn. The Gks. were defeated here by the Turkish Nationalists in April 1921. The Moslems were defeated near here by Godfrey de Bouillon in 1097. Pop. 61,000 (vilayet 244,600).

Eski Zagra, or **Eski Sagra**, see STARA-ZAGORA.

Esmeraldas, tn. in Ecuador, S. America, bordering on Colombia on the nr. of the same name and cap. of the prov. of E. (area 5465 sq. m.). The name is derived from the old emerald mines in the vicinity. Vessels anchor outside the bar (depth, high tide, 10 ft.) and load and discharge by means of launches. It is the centre of a rich agric. dist., and the headquarters for a number of merchants and mining companies. Straw hats are manuf. and gold is mined. Pop. (prov.) 58,900, (tn.) 7000.

Esna, tn. of Upper Egypt, 25 to 30 m. S. of the ruins of Thebes, on the l.b. of the Nile. It is celebrated for the ruins of a vast anct. temple to the ram-headed god Khnum, built in the time of the Rom. emperors Claudius and Vespasian and others, and also possesses a Coptic monastery. Its chief manufs. are pot-

tery, shawls, and cotton, in which commodities it carries on an active trade. A barrage was built and opened in 1909 to hold up the Nile water in low floods. Pop. about 20,000.

Esop, see AESOPUS.

Esoteric and **Exoteric** (Gk. *esotērikos*, inner and *exotērikos*, outer), terms originally derived from the act. 'mysteries', the first designating doctrines intended only for the initiated, the second those intended for the uninitiated or general public. By analogy these words have been used to mark distinctions thought to exist between certain classes of the writings of Aristotle and other philosophers. Aristotle himself only uses the term 'exoteric,' which Grotto takes to refer to the 'didactic' as opposed to the 'didactic' method.

Esox, or *Esox lucius*, the generic name of the pike, which belongs to the family *Esocidae*. It is characterised by the absence of scales on the head, by a long narrow body terminating in a forked caudal fin, and by a long, broad, depressed snout in which the upper jaw exceeds the lower in length. The pike inhabits the fresh waters of Europe, America, and Asia, and not uncommonly attains a length of 45 or 46 in., with a weight of 35 or 36 lb. It is the most voracious and greedy of all fresh-water fish, and will devour all kinds of smaller fish, even the young of its own kind.

Espalier (Fr. railing for fruit-trees; It. *spalliera*, from *spalla*, a shoulder), railing on which fruit trees are trained. The term E. is also applied to the system of training plants to grow as Es. on a trellis (espalier). Es. may be constructed of wood, iron, or, more cheaply, by means of strong wire, supported by upright wooden or iron posts. Es. have the advantage of protecting the fruits to a great extent from the wind, and thus preventing a large quantity being shaken off before they are properly ripened. The most suitable fruit trees for Es., commonly grown in Great Britain, are apple and pear trees. Their treatment is usually similar to that of wall trees, but they are generally trained to form horizontal branches. For the raising of Es., plants of one year should be chosen and planted at distances that will allow of each one covering a surface of about 20 sq. yds. The stem should be cut about 12 in. from ground-level in about a year from planting, immediately above three buds. Lateral branches will then be formed by two of these buds, while the highest one will form the extension of the stem, and these three stems must be kept in an equal condition of vigour during the summer. During the second year no more lateral branches must be allowed to grow, but after this a fresh pair of lateral branches can be allowed to grow each year. The wood of the tree will be fully estab. in about sixteen years.

Espartero, Baldomero (1792-1879), b. at Granatula, La Mancha, was the son of a cartwright. He played an important part in the Carlist wars, and as commander-in-chief concluded the Carlist

Convention in 1839, which brought the war to an end. In 1811 he became regent, from which position he was driven two years later by a counter-revolution. In 1854, however, he was recalled to save Isabel II.'s throne, and for a time he became dictator and able to conciliate all progressive parties. He retired from public life in 1856. See life by E. Florez, 1844-45.

Esparto Grass, or *Stipa tenacissima*, species of Gramineæ closely allied to the feather-grass, and occurs in N. Africa. It is a graceful plant often cultivated in Britain for its beauty, and is largely used in the manu. of paper. Two other species of grass, *Lyneum Spartum* and *Ampelodesma tenax*, both of which are to be found in Africa and round the Mediterranean, serve the same purpose as E. G.

Esperanto, international auxiliary language invented by Dr. L. L. Zamenhof, an oculist of Warsaw, and first pub. in 1887. The first journal in the language, *La Esperantisto*, which was issued in 1889 from a press in Nuremberg, was suppressed, as the Russian Gov. forbade its entry into Russia on the ground that the jour. contained contributions by Tolstoy. The language, which in 1895 had spread to France, began an era of rapid progress from the first international congress, held in Boulogne in 1907. In construction, E. differs fundamentally from its predecessor, Volapük. Every word, before incorporated into Volapük, underwent a process of mutilation, and the author (Abbé Schleyer) did not even hesitate to create words arbitrarily. ('Volapük,' e.g., is a corruption of two Eng. words, 'world' and 'speech.') On the other hand, E. is based, broadly speaking, on the principle that, with a view to attaining the maximum of internationality, the vocabulary of the international language should consist of root-words which are found to be common to sev. languages of Romance and Germanic origin, due attention being paid to other factors.

International words (e.g. theatre, nature, park, character, centre, form, telephone) are incorporated into the language without change, beyond conformity with the orthography. E., too, is strictly phonetic, its twenty-eight letters representing distinct sounds, and there are no digraphs. Each part of speech has a distinct termination, e.g. nouns end in *o*, adjectives in *a*, derived adverbs in *e*: there is only one conjugation to the verb, which has twelve terminations; the prepositions have a clearly defined meaning, and by the aid of some thirty prefixes and suffixes the language assumes a wonderful flexibility. The 'constitution' of E., according to its protagonists, guards the language from arbitrary or capricious changes, while at the same time allowing great latitude in the adaptation of new words to the international setting. The author of E. (see the 'Declaration' of Boulogne, etc.) disclaims any rights of ownership or control of the language. This attitude is of vital importance, as it was on the question of ownership that Volapük came to grief. The headquarters of E. in England is the

Brit. Esperanto Association, 140, Holland Park Avenue, W. 11. The Universala Esperanto-Asocio is an association founded to utilise the auxiliary language for tourist and commercial purposes. The following is the Lord's Prayer in E.: 'Patro nia, kiu estas en la ciela: Sankta estu Via nomo: Venu reĝeco Via: Estu volo Via, kiel en la ĉielo, tiel ankaŭ sur la tero: Pardon nian ĉiutagan donu al ni hodiaŭ: Kaj pardonu al ni ŝuldojn niajn, kiel ni ankaŭ pardonas al niaj ŝuldantoj: Kaj ne konduku nin en tenton: sed liberigu nin de malbono: ĉar Via estas la regado, la forto, kaj la gloro, eterne. Amen.' Its old rival, Ido, is virtually extinct. E. has a considerable following and has had an experience in use which no other so-called international language has now or ever had. The League of Nations in 1924 recommended that the States Members should grant to E. 'as a practical auxiliary language for international communication side by side with the national language in use,' the treatment and charges in force for a language *en clair* in telegraphic and wireless communications. In 1925 the International Telegraphic Union accordingly recognised E. as a plain language. Regular broadcasts have been given in E. from a number of radio stations. See also Ido (Revised Esperanto).

Esperet, Franchet d', see FRANCHET D' ESPEREY.

Espinal, tn. in Colombia, S. America, 75 m. S.W. of Bogotá. It has pottery works and tobacco plantations. Pop. 10,000.

Espionage. The organised employment of secret agents by govts. to obtain information concerning other countries which cannot be obtained by open methods. It also includes the dissemination of false information intended to deceive other countries. As the essence of espionage is secrecy, it follows that any treatise upon the subject, purporting to give details of the inner workings of any particular current system, must be regarded with doubt. The value of secret information is immense, because it gives the receiver a definite advantage over the opposite party, and by no one is this appreciated more than by military commanders. An early example of spying is to be found in the O. T., where Moses sent men to 'spy out the land of Canaan.' One novel method of conveying information to the authority concerned is that employed by Histæus when at the court of Darius, king of Persia. He was watched so minutely that he hit upon the idea of shaving his servant's head, writing a message on the head, and then, when the hair had grown again, sending him to the person concerned.

Before the First World War Germany had a well-developed secret service, and it is estimated that over 20,000 of her agents were in France in various occupations. There is always a note of picturesqueness connected with spying, mainly due to the fact that it appeals only to the more adventurous spirits who have the dual gift of caution and boldness. Among the First World War spies Colonel T. E. Lawrence

and Mata Hari will be remembered. The former was Brit. and operated in Egypt and Palestine; whilst the latter was a Javanese woman, who operated in France on behalf of Germany. She was caught and executed.

In Great Britain the organisation entrusted with the security of the state is Military Intelligence No. 5 (M.I.5), part of the War Office. Its task is to stop agents of foreign Powers, or even misguided Brit. subjects, from knowingly or unknowingly transmitting the secrets of Britain to any country abroad, whether that country be hostile, neutral, or even friendly. The chief function of M.I.5 is counter-espionage. Foreign agents, or terrorists, who operate in this country with a fixed plan of campaign, are usually foiled by M.I.5 sooner or later. On such occasions M.I.5 normally co-operates with the Special Branch of Scotland Yard.

Prior to the outbreak of the war German secret service agents or Nazi spies were actively engaged in undermining public allegiance in most countries of the world, and securing bands of Nazi sympathisers ready to co-operate with Germany as soon as any particular country was invaded. This wholesale system of E. was, to some extent, responsible for the rapid military collapse of Poland; it was even more effective in the downfall of Norway and Holland, in both of which cases Norwegian and Dutch collaborators helped to bring about the collapse of their countries resistance to invasion. During the invasions of all these countries the Gers. adopted the practice of dropping in parachutes soldiers, persons disguised in the uniforms of the Allies, and persons habited as civilians behind the invaded country's battle lines and even in the heart of the country itself. In International Law there can be no doubt that parachutists, if not regular soldiers, should be treated as spies. Since the war there has been sensational evidence of the activities of Soviet agents all over the world, especially in U.S.A. and Canada in connection with the atom bomb. See M. Ritchings, *Espionage: The Secret Service of the English Crown*, 1935; J. Thompson and S. Padover, *Espionage: Secret Diplomacy, 1500-1815*, 1937; R. Hirsch, *The Soviet Spies*, 1947; I. Gouzenko, *This was my Choice*, 1948. See also FIFTH COLUMN.

Espirito or **Espiritu Santo**, maritime state of Brazil, first occupied by the Portuguese in 1535. It is bounded N. by Bahia, W. by Minas Geraes, S. by Ilho de Janeiro, E. by the Atlantic. There are tropical forests on the slopes of the Serras dos Aimorés and Negra. It is swampy near the coast. Rio Doce, the chief riv., divides it into two: the Parahiba do Sul is on the S. boundary. The area is about 17,310 sq. in. The cap., Victoria, on Espirito Santo Bay, is the best harbour. It is well watered and very fertile, and produces coffee, sugar, corn, and timber. There are iron ore deposits in the State. The State is well served by the central group of railways. There are 30,000 German colonists with their own schools and

churches, and also many Italians. Pop. 843,100.

Espiritu Santo, largest is. of the New Hebrides (q.v.), 75 m. by 45 m., heavily wooded and well watered. The highest point is Santo Peak, 5520 ft. There are a number of Brit. and Fr. settlers. Coconuts, cotton, cocoa, and maize are grown. Santo, as it is usually called, has a numerous native pop., but of late the death-rate has been very great. Cannibalism is still occasionally practised.

Esplanade (from Lat. *explanare*, to level), in fortification, the glacis of the counterscarp, or sloping of the parapet of the covered way towards the country. Also the open space separating the citadel of a fortress from the tn. It is especially used of a level terrace, intended as a public promenade, such as the open walks along the 'front' at seaside places.

Espirit, St., see BAYONNE.
Espronceda, José de (1810-42), Sp. poet and revolutionary politician. He was early imprisoned by the gov. for his radical views (c. 1825), and banished shortly afterwards. E. wrote the historical romance, *Don Sancho Saldaña o el Castellano de Cuellar* (1834). Returning to Madrid, he took part in the revolutionary contests (1835-36). Byron's influence in his writings is very marked. His best work was lyrical poetry, such as *El Diablo-Mundo*, *El Estudiante de Salamanca*, *El Verdugo*, *A la Patria*, *Hymn to the Sun*, and *El Mendigo*. His ambitious *Dona Blanca de Borbon* was not so successful.

Esquimalt, or **Esquimault**, seaport tn. of Vancouver Is., Canada, important as a naval station on the Pacific. It contains a naval yard, dry dock, arsenal, and hospital. There are a salmon cannery and a ship-building yard and an extensive harbour on the Juan de Fuca Strait. Pop. 7000.

Esquimaux, see ESKIMO.

Esquire (Old Fr. *escuyer*, from Lat. *scutarius*, shield-bearer), originally the attendant on a knight and bearer of his shield or armour. He ranked below the knight bachelor, and his office served as the apprentice-stage of knighthood. The title was one of function, not birth, and was not hereditary. It came to be a title of honour, implying a rank between that of knight and valet. According to Coke (2 *Institutes*, 688), any one may be called E. (usually written Esq.) who has a legal right to call himself a 'gentleman,' i.e. one who lawfully bears a coat-of-arms. The title is widely used now by courtesy for men of all ranks, and indeed is so used without discrimination, that many prefer simply to be addressed as 'Mr.' Those legally entitled to bear it include sons of peers or knights and their eldest sons, officers of the army and navy, and members of the Bar. E. has followed much the same course as the word 'gentleman.' See also SQUIRE. See John Selden, *Titles of Honour*, 1672.

Esquiros, Henri François Alphonse (c. 1812-76), Fr. poet, politician, and historian. He wrote both poems and novels of a strong socialistic tendency, and was imprisoned for his *L'évangile de*

peuple (1840). E. went to Holland and then to England, sending studies to the *Revue des deux Mondes*, afterwards known as *L'Angleterre et la vie anglaise* (1859-70). Other works are: *Les Hirondelles* (1834), *Charlotte Corday* (a novel, 1840), *Songs of a Prisoner* (1841), *Les Vierges martyres, les Vierges folles, les Vieilles sages* (1841-42), *Histoire des Montagnards* (1847), *La Morale universelle* (1859), *L'Emile du XIX^e Siècle* (1870).

Essad Pasha (c. 1875-1920), Albanian chieftain who, during the Balkan War (1912-13), defended Scutari against the combined Montenegrin and Serb forces, and who, at the conclusion of that siege, proclaimed himself prince of an autonomous Albania owning the suzerainty of Turkey. The family of Essad, the Top-tanis, came from Tirana, near Durazzo, and was of considerable wealth and power.

—Essad's brother, Gani, being the special friend of, and executioner to, the Sultan Abdul Hamid. Gani, losing the sultan's high favour, was done to death—a deed which made Essad the sworn foe of the Hamidean régime. He joined the Young Turk revolution in 1908, and from then till 1912 represented Durazzo in the Turkish parliament. His support of the Young Turks was of a very qualified nature, and he even tried to negotiate a Brit. protectorate. When Prince Wilhelm of Wied became Mpret in March 1914, E. became his minister of war and of the interior; but was exiled for disaffection—returning to become President of the Albanian Provisional Gov. Oct. 5, 1914; which he accomplished by terrifying the senate. When enemy forces drove him from Albania, he retired to Salonika. He afterwards presided over the Albanian delegation in Paris. At the close of the war he managed to overthrow the Italianised gov. estab. at Durazzo. He was murdered in a Paris street, June 13, 1920, by an Albanian named Aveni Rustani.

Essay (Fr. *essai*, attempt). What is now generally understood by an E. is a literary composition of moderate length on any given subject other than purely scientific. It should treat of life in general, and not of any specialised subject. It originally implied a want of finish, and Dr. Johnson defined it as 'an irregular, undigested piece.' An E. is strictly rather a series of personal comments than a finished argument or conclusive examination of any matter. As a separate form of Eng. literature, it dates from the close of the sixteenth century. The name appears to have become common on the pub. of Montaigne's *Essays* (1580). The first great name connected with the hist. of the English E. is that of Bacon (1561-1626). Abraham Cowley may, however, perhaps be more truly regarded as the father of Eng. E. His *E. of Myself* may be taken as a typical example of what such compositions should be. Other essayists of the seventeenth century were Sir Thomas Browne, Sir William Temple, and Dryden. The eighteenth century was the great age of essay-writing. In 1711 Joseph Addison and Richard Steele founded the *Spectator*,

thus popularising the E. as a form of literature in England. The *Tatler* and the *Guardian* also contained numerous examples of typical Es., mostly the work of Steele and Addison. Fielding's Es. appeared in the *Covent Garden Journal*, 1752, Dr. Johnson's in the *Rambler*, 1750, the *Adventurer*, 1752, and the *Idler*, 1759. Other essayists of this period were Jonathan Swift and Goldsmith (in the *Bee* and the *Citizen of the World*). Such terms as review, memoir, or treatise, apply better to more exhaustive studies, such as Locke's *Essay Concerning Human Understanding*, or Burke's *Essay on the Sublime and Beautiful*, while the journalistic 'article' may be used for slighter sketches than those entitled to be called Es. Names of the earlier period which deserve mention as writers of works closely approaching the E. in style are those of Sir Thomas More, Sir Philip Sidney, Robert Burton, Sir Thomas Overbury, Bernard Mandeville, Laurence Sterne, Daniel Defoe. A



HAZLITT

One of the great essayists of the nineteenth century

great revival of the E. took place early in the nineteenth century, and with this movement Charles Lamb's name is always closely connected. His *Essays of Elia* appeared in 1823, the *Last Essays of Elia* in 1833. Other essayists of note of the nineteenth century are Hazlitt, Leigh Hunt, Carlyle, Macaulay, Thackeray, Bagehot, Pater, and R. L. Stevenson. De Quincey, Southey, and Shelley also belong to the nineteenth century. The E. in modern times has not been quite so popular. Men are less often essayists first and foremost, but poets, historians, or novelists, who write Es. occasionally in leisure hours, and who have little or no interest in the didacticism which was so marked in, and indeed formed such an integral part of, the Es. of their predecessors. Some of the chief names are Augustine Birrell, A. O. Benson, E. V. Lucas, Andrew Lang, G. K. Chesterton, Austin Dobson, George Saintsbury,

Max Beerbohm, Hilaire Belloc, A. G. Gardner, Robert Lynd, Harold Nicolson. Pope alone in the eighteenth century conceived an E. in heroic verse. His *Es. On Criticism* and *On Man* are really treatises, but the *Moral Essays*, if in prose, might have appeared in the *Spectator*. Apart from this all Es. are understood to be prose writings. In America the chief essayists include W. Irving, R. W. Emerson, N. Hawthorne, and J. R. Lowell. In Germany, Lessing, Schlegel, and Hermann Grimm are among the best. The E. took firm root in France at a comparatively late period, the chief representatives being Montaigne, Voltaire, Rousseau, Lamartine, Cousin, Michelet, Sainte-Beuve, Gautier, Anatole France, and E. Faguet. See A. Chalmers, *British Essayists*, 1817; H. Walker, *The English Essay and Essayists*, 1915; E. Rhys, *Modern English Essays, 1870-1920*, 1922; J. B. Priestley, *Essayists, Past and Present*, 1925; M. G. Sagar, *Essays from Eighteenth Century Periodicals*, 1947.

Essays and Reviews. In 1860 a remarkable vol. was pub. under this title. All the contributors, excepting one, were clergymen of the Church of England, and the book was severely censured for heterodox views by nearly all the bishops and formally condemned by convocation in 1861. Bishop Thomson (afterwards archbishop of York) and Bishop Wilberforce replied to the *Essays and Reviews* in their works *Aids to Faith* (1861), and *Replies to Essays and Reviews* (1862). The vol. contained the following seven papers: (1) 'The Education of the World'; (2) 'Bunsen's Biblical Researches'; (3) 'On the Study of the Evidences of Christianity'; (4) 'The National Church'; (5) 'The Mosaic Cosmogony'; (6) 'Tendencies of Religious Thought in England'; (7) 'The Interpretation of Scripture.'

Esschen, tn. in Belgium, 18 m. N. of Antwerp, near the Dutch border. Pop. 8,700, engaged in agriculture and manuf. of sugar, wax, and tobacco.

Esseg, see **ESZEK**.

Essen, Hans Hendrik von, Count (1755-1824), Swedish field-marshal and statesman. He was a favourite of Gustavus III., fighting under him (1788-90). He warned the king against his assassination, but was unable to prevent it (1792). E. was governor of Stockholm (1796), becoming grand equerry in 1800. Charles III. made him councillor of state, with the title Count, and sent him as ambas. to Paris, where he negotiated peace (1810). See L. A. Thiers, *Histoire de l'Empire*, 1873.

Essen, old tn. a few miles to the N. of the Ruhr, in the centre of the Rhenish-Westphalian Coal Measures, Germany, which are among the most prolific in the world. Its famous Krupp works (before the Second World War) were the largest steel works in Europe; they also manuf. locomotives, goods-trucks, electric cranes, machinery, cash registers, cinematographic apparatus, surgical instruments, etc., but no war material until the advent of the Nazi rearmament policy, when they soon restored their great armament industry. Besides these works there were

numerous machine-shops, foundries, chemical factories, and coal mines. The Münsterkirche, seriously damaged in the Second World War, one of the most anct. churches in Germany, the W. choir, with its tower, dating from the tenth cent. The Protestant Marktkirche, now practically destroyed, was probably completed in 1066. E. had 3480 inhabs. in 1803 and 666,700 in 1940. As a railway and communications centre of great importance to the Gers. E. was the target of deadly raids, one of the heaviest being on July 25, 1943, when 2000 tons of bombs were dropped by the R.A.F., photographic interpretation showing that the damage to Krupp's works was greater than all that wrought in the previous raids of that year, 116 buildings being hit and the Diesel engine works being totally destroyed by fire. It was equally important an objective as the home of Krupp's armament works. The heaviest air raid on E. was that of March 11, 1945, when the Allied armies were advancing into Germany. Gen. Eisenhower states that on that day a record was estab. for the load of bombs dropped on a single target in one raid when 1079 heavy bombers of the R.A.F. rained some 5000 tons on the E. rail centre (though the record was surpassed on the 12th when 1108 heavies dropped 5487 tons on Dortmund). These attacks were energetically supported by fighters and fighter-bombers of the R.A.F. Second Tactical Air Force and the U.S. Tactical Air Command. The resulting chaos was such as to prove far beyond the powers of the Reichsbahn repair organisation to remedy, despite its immense efforts to keep the lines open (see *Report by the Supreme Commander to the Combined Chiefs of Staff on the Operations in Europe of the Allied Expeditionary Force*, H.M.S.O. 1946). The combined effect of all these attacks was that the vast arms factories, marshalling yards, railways and inland docks were out of action or actually obliterated. After the Amer. armies had encircled the Ruhr (April 1, 1945) the fall of E. soon followed (April 6). See K. Ribbeck, *Geschichte der Stadt Essen*, 1915; H. Spethmann (ed.) *Essen die Stadt*, 1938. See also **RUHR** and **WESTERN FRONT IN SECOND WORLD WAR**.

Essence (Lat. *essentia*, from *esse*, to be): 1. In philosophy, the equivalent of Gk. *οὐσία*, and was originally used in the same sense as 'substance'. Later 'substance' came to be used for the undetermined substratum of a thing, E. for the qualities expressed in the definition of a thing. Locke neatly defines it by saying: 'Essence may be taken for the very being of a thing, whereby it is what it is.' 2. In pharmacy, Es. are solutions of essential oils in alcohol, and are capable of being prepared in two ways: (1) By adding refined spirit to the odiferous parts of plants or to the essential oils, and distilling. (2) By adding the essential oil to the refined spirit and agitating till a uniform mixture is obtained. Thus E. of lemons is merely a solution of volatile oil in rectified spirit. The term E., however, has received a more comprehensive

significance and is applied to a liquid possessing the properties of the substance of which it professes to be the E. *Quintessence* (Lat. *quinta essentia*, fifth E.), the pure E. of anything, a solution of an essential oil in alcohol. The name applies to the purest essence obtained after five distillations, and was originally used to denote ether.

Essendon, tn. of Victoria, Australia, situated in Bourke co., on the Moonee Ponds, at a distance of 5 m. from Melbourne. Pop. 20,000.

Essenes, Jewish religious brotherhood of the time of Christ. Though it played a somewhat important part in the hist. of Jerusalem, very little is accurately known about the E. The Rom. historian, Pliny, the Jewish Josephus, and Philo the Alexandrian are the authorities who speak of them from personal knowledge. They are nowhere mentioned either in the Bible or in the Talmud, though it has been commonly held that the Nazirim referred to in the Talmud are the E. under another name. On the one hand, the E. were highly-developed Pharisees, laying exceedingly great stress on the maintenance of ceremonial purity. Ceremonial washings formed an important part of their practice, and white garments were worn. Their food was specially prepared by the priests, and the common meal was eaten with great solemnity. Asceticism was the keynote of their system; every form of sensual enjoyment was held to be sinful. Marriage and intercourse with women were entirely forbidden. The E. were communists, mostly engaged in agriculture. The proceeds of all labour went into the common purse, from which all expenses were paid. Entrance to the order could be obtained only by a three years' novitiate. The E. objected to animal slaughter, and this fact prevented many of them from joining in the temple service. Moreover, it is said that they engaged in sun-worship. The sect came to an end in the second century A.D. Owing to resemblances to the E. in life and teaching, John the Baptist has been regarded as one of them, but there are important facts against this theory. The E. represented Judaism in its purest essence, and in the spirit of their teaching came nearer Christianity than did any other contemporaneous sect. See J. Lightfoot, *Epistles to Colossians and to Philemon*, 1876 and G. Moore, *The Brook Kerith*, 1916.

Essential Oils, oils which possess the odours in a concentrated form of the plants or vegetable substances from which they are obtained. These oils are generally contained in a special gland or cell within the plant. The E. O. are generally insoluble in water, but they dissolve freely in alcohol, ether, or fatty oils. They contain a large proportion of carbon which causes them to ignite easily, but as a rule they leave no permanent grease spot. They possess an aromatic smell, a hot burning taste, and can be distilled unchanged.

Essequibo, riv. of Brit. Guiana, which has its source in the Acaari Mts., about

45 m. N. of the Equator. It is a riv. of many rapids, and therefore very difficult to navigate. The most noted falls of the E. itself are the Aretaka cataracts. There are sev. tribs., the Cuyuni with the Mazuruni, the Rupununi, and the Potaro. After flowing for a distance of 620 m. the E. enters the Atlantic, and at its mouth it measures a width of 20 m. Among the natural wonders of the Essequibo R. region are the Kaieteur Falls (the old man's fall) on the Potaro R. These have a clear drop of 741 ft., or nearly five times the height of Niagara Falls. Owing to the difficulty of the journey, few people from other parts of the world have visited this spot, and its remoteness and seclusion greatly enhance its impressiveness. The Potaro R. here has a width of 400 ft. and a depth of 35 ft., plunging down a valley of nearly 800 ft., whence it flows away amid ravines of thickly wooded sandstone cliffs on a winding course, broken in places by falls and rapids, which have to be circumvented by portages, until eventually it reaches the Essequibo. The dist. round the falls has now been proclaimed by the gov. of Brit. Guiana as the Kaieteur National Park, and steps have been taken to prevent destruction of birds and animals. The altitude of the setting is from 1200 to 2000 ft. and hopes are entertained of making it a health resort for Brit. Guiana. The riv. gives its name to one of the three counties into which Brit. Guiana is divided. (See BRITISH GUIANA.) The central colony of Demerara was an offshoot from Essequibo, and was estab. in 1615.

Essex (A.-S. East-Seaxe), maritime co., S.E. England, bounded by Cambridge and Suffolk on the N., E. by the N. Sea, S. by the R. Thames, W. by London, Middlesex, and Hertfordshire. The surface is flat and marshy near the coast, but richly wooded in the centre and N. Among the chief rivs. are the Thames, Stour, Lee, Colne, Crouch, and Blackwater. Farming is good, and splendid wheat-crops flourish in E. Cereals, leazels, saffron; hops are largely grown and livestock raised. The manufs., include silk, lace, and straw-plats. There is a gov. powder-factory at Waltham Abbey. Oyster-fisheries and breweries are important. The Tilbury and Victoria and Albert Docks of the Port of London are on E. coast. Harwich is the port for continental traffic, and the cap. is Chelmsford. Pop. 1,314,000. See T. Wright, *History and Topography of Essex*, 1831; *Victoria County History, Essex*, 1903-7; A. C. Kelway's ed. of *Memorials of Old Essex*, 1908; P. Reaney, *Essex*, 1928; H. W. Tompkins, *Companion into Essex*; Clifford Bax, *Highways and Byways in Essex*, 1939; A. Moe, *Essex*, 1942; W. Addison, *Essex Heyday*, 1949.

Essex, Earl of. This title was conferred in 1572 on Walter Devereux, the scion of an old Hertfordshire house, but was originally borne by Devereux's ancestors (the Mandevilles, Bohuns, Bouchiers), and by Thomas Cromwell. In 1539, King Stephen created Geoffrey Mandeville earl of Essex, and the family of Bohun was the

next to bear the title, but on the death of Humphrey Bohun, 1373, the peerage seems to have reverted to the crown. In 1461 Edward IV. created Henry Bouchier earl of Essex, but on the death of his successor, the earldom became extinct, and in 1540 it descended upon the Cromwell family in the person of Thomas Cromwell (*q.v.*). The family of Parr obtained the earldom after the execution of Cromwell, but forfeited it in 1553. Thus the title was borne by six different families in Eng. hist. Two members of the Devereux family had the honour conferred upon them, viz. Robert (*q.v.*), earl marshal of England and one of Queen Elizabeth's favourites; and Robert Devereux (*q.v.*), commander-in-chief of the parl. forces in the Civil war. The earldom expired in 1646 at his death, but Charles II. conferred the title on the Capel family in 1661 (*see* CAPEL, ARTIUR), and the present earl is a representative of this family.

Essex, James (c. 1723-84), Eng. architect, son of a carpenter, *b.* at Cambridge; he was educated there at King's College. He showed great skill in Gothic architecture, and restored and altered many public buildings. These include King's College Chapel; Ely and Lincoln Cathedrals. He also designed the Ramsden building at St. Catherine's College (1757), the stone bridge at Trinity College (1766), and the Sidney Sussex College Chapel (1784).

Essex Regiment, formerly the 44th and 56th regiments, which were linked in 1881 to form the present regiment. The 44th was raised in 1741. Served in N. America under Gen. Braddock, and remained in Canada until 1765. Returned to America 1775 and served against the Fr. also in West Indies. Fought under Abercromby in Egypt in 1801. Joined Wellington's army in Peninsula in 1811; and captured a Fr. 'Eagle' at Salamanca; fought at Waterloo; thence in Burma and Afghanistan, Crimean and China campaigns. The 56th was raised in 1755, served at Havana in 1762, and was in the defence of Gibraltar, 1779-83. Served again in W. Indies; then went to India (1805). Served in Crimea and then in Egypt. Fought in S. African campaign, 1899-1902. Raised thirty-one battalions during First World War and served in France, Flanders, Gallipoli, Egypt, Palestine. As a unit of the famous 4th Indian Div. the regiment played their part at Sidi Barrani in the first great victory won by the Brit. Army in the Second World War, and later they took part in the capture of Gen. von Arnim and his forces in N. Tunisia (1943). In the battle of Normandy (1944) the 2nd Essex were part of the 45th Territorial Div. and fought in the battles for Venlo. The regiment also fought on the It. front. This is one of the few regiments which bears an 'Eagle' on its colours, which commemorates that captured at Salamanca. At Oxford Point, Bermuda, there is a quaint monument of tools, bayonets, and iron hoops erected by the men of the 56th Regiment (2nd Battalion, E. R.), who were isolated there during an outbreak of yellow fever many years ago.

Essex, Robert Devereux, second Earl of (1567-1601), Eng. nobleman and favourite of Elizabeth, son of Walter (*d.* 1576). He was educated at Cambridge, and accompanied Leicester's expedition to Holland in 1585. E. became master of the horse (1587) and took part in Drake's expedition to Portugal (1589). In 1591 he commanded an expedition to Normandy, and the land-forces at Cadiz in 1596. He married Sidney's widow in 1590, became Privy Councillor, 1593; earl marshal of England, 1597; and chancellor of Cambridge Univ., 1598. E. was also commander on 'the islands voyage,' an expedition to the Azores. In 1599 he was appointed lord-deputy of Ireland, but fell into disgrace for the failure of his operations against the Irish rebels (*see* note on Shakespeare's *Henry V.*, prol. to Act. v.). He tried to force a hearing from the queen, and falling in that, formed a plot to compel her to dismiss his enemies from power. For this he was accused of treason and executed, Bacon being his prosecutor. Elizabeth was said to have been inconsolable for his loss. *See* Earl of Clarendon, *The Characters of Robert, Earl of Essex, and George, Duke of Buckingham*, 1700; D. Hume, *History of England*, 1789; *The Devereux papers with R. Broughton's Memoirs (1575-1601)* ed. by H. Malden, 1923; G. B. Harrison, *The Life and Death of Robert Devereux, Earl of Essex*, 1937.

Essex, Robert Devereux, third Earl of (c. 1591-1646), Eng. general, son of Robert (executed in 1601), *b.* in London. James I. restored to him his father's rank and titles (1604). He was a companion of the Prince of Wales (later Charles I.), but by 1626 had joined the parl. party. E. was lieutenant-general in the army sent against the Scottish Covenanters (1639). He refused to accompany Charles in his flight from London, and became leader of the Presbyterian party. In 1642 he commanded the parliamentary army, and fought at Edgehill; captured Reading, and relieved Gloucester (1643). E. won the first battle of Newbury in 1643. His invasion of Cornwall (1644) proved unsuccessful, and his army capitulated at Lostwithiel. E. resigned his commission (1645) on the passing of the 'Self-denying Ordinance.' He was the last of his family to bear the title. *See* R. Codrington, *Life of Robert, Earl of Essex*, 1646; Sir R. Cust, *Lives of the Warriors of the Civil Wars of France and England*, 1867.

Essex, Walter Devereux, first Earl of (c. 1541-76), Eng. nobleman and statesman, son of Sir Richard Devereux. In 1569 he raised troops to suppress the N. rebellion under the earls of Westmorland and Northumberland, and was created earl of E. in 1572 for this service. A favourite of Elizabeth, he was sent as commander (1573) to conquer the Ulster rebels. His attempts to subdue and colonise Ulster were not very successful. E. resigned his command in 1575, but returned as earl marshal of Ireland, and died at Dublin. *See* D. Hume, *History of England*, 1789; W. Devereux, *Lives of the Earls of Essex*, 1855.

Essington Port, bay of N. Australia on the N. side of Coburg peninsula. The shores of the bay are low and destitute of vegetation. The climate is unhealthy. On the W. side, 17 m. from its entrance, the Brit. settlement of Victoria was founded in 1839. It was abandoned in consequence of its insalubrity in the year 1845.

Esslingen, anct. tn. of Württemberg, Germany, with 40,560 inhabs., dominated by a castle. It has three churches of the thirteenth and fourteenth centuries and a fine late Gothic tn. hall of 1430, the Katharine hospital founded in the thirteenth century, and the remains of the tn. walls. The industrial quarters are outside the old tn., there are machine, textile (especially gloves), leather toys and furniture industries. It is celebrated for its wines. Pop. 43,100.

Essonnes, Fr. tn. in the dept. of Seine-et-Oise, on the Essonne, half a m. S.W. of Corbeil. It has important paper mills. Pop. 10,000.

Est, canal in the N.E. of France, starting from the Meuse near Givet, and traversing the valley of the Meuse to Port-sur-Saône. It includes canalised portions of the Rs. Meuse and Moselle. The total length is 285 m.

Established *Char.* *sec.* ENGLAND, CHURCH OF; SCOTLAND, CHURCH OF; STATE CHURCH.

Estaing, Charles Hector Théodat, Comte d' (1729-94), Fr. admiral, a native of Auvergne. In 1778 he went to help the U.S.A. against Britain, and in the following year took St. Vincent and Grenada. At Hospital Hill Forts on a plateau 400 ft. high adjoining St. George's, the Brit. under Sir George (afterwards Lord) Macartney made a brilliant stand against the Fr. under d'E. in July 1779. D'E's force of 3000 only succeeded in carrying the lines after losing 300 to a garrison which over the whole island only numbered 500. D'E. however failed to capture St. Lucia and was beaten off by a strong force landed on the is. through the advice of Rodney (1778). D'E. was, however, wounded in a subsequent engagement, and returned to France, where he was eventually put to death for supporting Marie Antoinette. See B. Edwards, *The History, Civil and Commercial, of the British Colonies in the West Indies*, 1793.

Estaires, Fr. tn. in Nord, on the Lys. 12 m. W. of Lille. In the First World War, captured by the Gers. In their final effort of 1918 on April 10; two days later Gen. Haig issued his fateful Order of the Day containing the sentence 'every position must be held to the last man; there must be no retirement.' Pop. 4500.

Estancia, tn. of Brazil, 25 m. S.W. of Sergipe on the Piauy. It exports cotton and tobacco. Pop. 12,000.

Estate. An E. signifies that title or interest which a person has in lands, tenements, hereditaments, or other property. It is either real E., which comprises freehold lands, tenements, or hereditaments, and copyhold lands; or personal E.,

which comprises all other kinds of property or rights in or over property, including leasehold interests in lands, tenements, and hereditaments (*see also* ENTAIL, FEE, FEE SIMPLE, and FEE TAIL). This is the modern legal connotation of the term, and it signifies not the subject of ownership itself, but the proprietary interest subsisting in it. Es. are either in possession or in expectancy. Es. in expectancy are divided into Es. in remainder or reversion (*see* CONTINGENT REMAINDER, REVERSION (in law)). An E. in reversion arises either expressly, or by mere implication of law, as where a tenant in fee simple grants a life E. to another, and thereby impliedly reserves to himself the E. ownership in reversion. Es. may be enjoyed by one person only, or by more than one either severally (*see* COMMON, TENANCY IN) or jointly. Es. are also either legal or equitable. A legal E. subsists in the owner when he is in actual possession, and is also either entitled to the beneficial interest himself or holds in trust for some other person. A mortgagee by deed is the legal owner of land, the subject of the mortgage, but holds the residue of proceeds, where a sale takes place for the realisation of his debt, in trust for the mortgager, or equitable owner. An equitable E. subsists in a person who, though not the actual and legal owner, is entitled to the beneficial interest of the property of which some other person is in possession as legal owner. Es. in popular language have come by a process of metonymy or extension to mean the actual lands and premises of a landowner of some territorial pretensions. The word was also used formerly as a synonym for status, or a man's condition in life. It is still used with a somewhat similar connotation in respect of the hierarchy of political classes, which in Great Britain are the three Es. of Lords Spiritual, Lords Temporal, and Commons. *See* ESTATES OF THE REALM.

Estate Duties, name given in the U.K. to the duties paid on the estates of deceased persons. They date from 1894. Real property, hitherto exempt from charges of this kind, was made to pay at the same rate as personal property, and the duties were levied on a graduated scale. The legacy duty, which was in force before 1894, was sometimes classed with the E. D. Gifts made within three years of death, unless part of the deceased's normal expenditure, were charged with duty. Payment may be made in real or leasehold property; also in war loan, which is taken at its nominal value. Interest on the duty on personal property is charged at the rate of 4 per cent, reckoned from the day of the death. On real estate this can be paid by instalments, on which interest is charged only after a year (*see further under* DEATH DUTIES). Since 1949 legacy and succession duties have been consolidated into estate duty, which was increased by the budget of that year in order to raise £20,000,000 more. The table, on p. 430, shows the present rates of estate duty and the rates proposed in 1949:—

Net capital value of total estate			Rate per cent of duty	Net capital value of total estate			Rate per cent of duty
Exceeding £	not exceeding £			Exceeding £	not exceeding £		
—	2,000		nil	—	2,000		nil
2,000	3,000		1	2,000	3,000		1
3,000	5,000		2	3,000	5,000		2
5,000	7,500		3	5,000	7,500		3
7,500	10,000		4	7,500	10,000		4
10,000	12,500		6	10,000	12,500		6
12,500	15,000		8	12,500	15,000		8
15,000	20,000		10	15,000	17,500		10
20,000	25,000		12	17,500	20,000		12
25,000	30,000		14	20,000	25,000		14
30,000	35,000		16	25,000	30,000		16
35,000	40,000		18	30,000	35,000		18
40,000	45,000		20	35,000	40,000		20
45,000	50,000		22	40,000	45,000		22
50,000	60,000		24	45,000	50,000		24
60,000	75,000		27	50,000	60,000		27
75,000	100,000		30	60,000	75,000		30
100,000	150,000		35	75,000	100,000		35
150,000	200,000		40	100,000	150,000		40
200,000	250,000		45	150,000	200,000		45
250,000	300,000		50	200,000	300,000		50
300,000	500,000		55	300,000	500,000		55
500,000	750,000		60	500,000	750,000		60
750,000	1,000,000		65	750,000	1,000,000		65
1,000,000	2,000,000		70	1,000,000			70
2,000,000			75				80

The rates of the legacy and succession duties, which it was proposed in the budget of 1919 to abolish, are as follows:

Relationship of the Beneficiary	Rate of duty
Husband or wife, child or lineal descendant of child, father or mother or any lineal ancestor . . .	2
Brother or sister, lineal descendant of brother or sister . . .	10
Any other beneficiary (excluding charities . . .)	20
Charities . . .	10

The net receipts from estate duty between 1946-1948 were as follows:

Year ended	Estate Duty	Legacy and succession duty
March 31	£	£
1946	108,559,893	9,708,629
1947	135,925,929	11,483,716
1948	156,622,912	12,552,344

Estate Duty, see DEATH DUTIES.

Estate Tail, see ENTAIL.

Estates of the Realm means the classes or orders of men invested with political rights in a nation or state. In Great Britain, for example, the three E. of the R. are the Lords Spiritual (or bishops), the Lords Temporal (peers entitled to vote in the House of Lords), and the Commons. The sovereign and these three estates together form the corporation or body politic of the kingdom. The Commons or third estate comprises not only the members of any given House of Commons but the whole of the electorate, i.e. every

one who has a voice in Parliament whether personally or by his elected representatives. Originally the phrase denoted the nobles, the clergy, and the commons, but the growth of parliament and the consequent elimination of the clergy as a separate political body gradually tended to stereotype the phrase in the above and narrower meaning. Analogous estates are, of course, to be found in most countries with an estab. polity. The term Fourth Estate of the Realm has often been applied to the public Press, on account of the enormous influence exerted by it in regard to public matters.

Estaunié, (Louis-Marie-) Edouard (1862-1942), Fr. novelist; b. at Dijon; son of a mining engineer. Educated at Jesuit Coll. of Dijon, and Lycée St. Louis; old pupil of École Polytechnique. After science-teaching in Paris, employed in engineering section of dept. of posts and telegraphs, became director of construction, and finished as inspector-general of telegraphs. He began novel-writing with *Un Simple*, (1891), followed in the same year by *Bonne Dame*. E. became celebrated with *L'Empire* (1895) suggested by his Jesuit education. Other works include: *L'Épave* (1902), *La Vie Secrète* (1908), *Les Choses Vient* (1913), *Solitudes* (1917), *L'Ascension de M. Baslevre* (1921), *L'Appel de la Route* (1923), *L'Infirmes aux Mains de Lumière* (1923), *Le Labyrinthe* (1924), *Tels qu'ils furent* (1927). He was elected member of the Academy, 1924. See life by J. Charpentier, 1932.

Estcourt (3833 ft. high), seat of magistracy for Weenen co., Natal, S. Africa.

has large bacon and cheese factories. The climate is one of the finest in Natal and the scenery charming. Stock-breeding is carried on on a large scale. (White) Pop. 1000

Este, tn. of Italy, in Lombardy. It gave name to a noble family, very prominent in It. hist., of the fifteenth and sixteenth centuries, from whom the present royal family of England is descended. The tn. has picturesque battlements and walls from the Venetian period. Pop. 13,000.

Este, House of, one of the most anct. and famous princely families of Italy, founded by Oberto II. (d. c. 1015), Margrave of Casal Maggiore. To Azzo II., his grandson, the Emperor Henry III.

divided into two branches, one of which died out in 1838. The three existing branches into which one of the original ones was divided are the Csesznek, Altsohl, and Forchtenstein. The chief members of the family are: *Paul IV.* (1635-1713), who became a field-marshal at the age of thirty, and was made a prince of the empire. *Nicholas IV.* (1765-1833), a great promoter of art, and the man to whom Napoleon is said to have offered the throne of Italy. *Paul Anthony* (1786-1866), a diplomat, who was Austrian ambas. in London until 1842, and in 1848 became minister for foreign affairs under Batthyani. *Moritz* (1807-90) and *Moritz* (b. 1881) earned fame also as diplomats, and statesmen.



THE TOMB OF BEATRICE D'ESTE AND HER HUSBAND

Although this lady lived only twenty-two years (1475-97), she is one of the most celebrated members of the House of Este

granted Este and other It. fiefs. Azzo was created Duke of Milan, and assumed the name of Este. His two sons Welf (Guelph) IV. and Fulco I. founded respectively a Ger. and an It. branch of the H. of E. The It. branch furnished the leaders of the Guelphs in the thirteenth and fourteenth centuries. The male It. line became extinct on the death of Hercules III., 1803. The Estensi were mostly good and enlightened rulers, and founded the universities of Padua and Ferrara. See G. Crawford, *History of the House of Este*, 1681; A. Ciscato, *Storia d'Este dalle Origini al 1839*, 1890; L. Planiscq, *Die Estensche Kunstsammlung*, 1919.

Estella, tn. in the prov. of Navarra, Spain. It figured largely in the Carlist wars of 1833. Pop. 6000.

Estepa, tn. in the prov. of Seville, Spain, which figured in Rom. times under the name of Astapa. Pop. 8000.

Estepona, seaport tn. in the prov. of Malaga, Spain. It produces large quantities of fruit and vegetables. Pop. 10,000.

Esterhazy de Galantha, the name of an anct. Hungarian family dating from the thirteenth century, at which time it was

Esters, Ethereal Salts, or Acidic Ethers, are compounds formed by the replacing of the hydrogen in acids by alkyl groups; they occupy the same position in organic chemistry as the metallic salts do in inorganic. They are formed by the action of an acid or acid chloride on an alcohol, and are, as a rule, pleasant, fruity-smelling liquids, non-miscible with water, which are hydrolysed on heating with alkalis, an alcohol and the salt of an acid being formed. The fats consist of the palmitic, stearic, and oleic E. of glycerin, and on boiling with soda, the sodium salt of the acid (soap) and glycerin are formed. The process is known as 'saponification.' Many E. are used for flavouring purposes, e.g. amyl acetate (jargonelle pear), ethyl butyrate (pineapple), etc., the former also being used as a solvent for celluloid.

Esther, Book of, tells how in the reign of the Persian king Ahasuerus, Haman, the king's minister, was at last bringing to a successful end his intrigues for the extermination of the Jews. But Ahasuerus had just married Esther, a Jewess, though her nationality is kept secret from her husband. She and her uncle, Mordecai, make a counterplot, which is ultimately

successful. Mordecai is made minister and raised to great honour; Haman is hanged on the gallows 50 cubits high, which he has prepared for Mordecai, and instead of the massacre of the Jews, a massacre of the Persians takes place by royal edict. The book then tells of the institution of the feast of Purim to commemorate this great deliverance. Ahasuerus is the Gk. Xerxes, and Mordecai is represented as becoming minister in the twelfth year of his reign, i.e. in 474 B.C. The date of composition, however, is the third or second century B.C., and the historical setting is so untrustworthy that many critics regard it as entirely the invention of the writer, a romance intended to further the observance of the feast of Purim. The work was in much favour among the Jews, and later became incorporated into the Christian canon of the O.T. Luther, in later years, did not scruple to express the small account in which he held the work. The tone is, indeed, violent and secular. It is noteworthy that the name of God does not appear once, while the name of the Great King appears about two hundred times. See commentaries by L. B. Paton, 1908, and G. Smith, 1930; and J. Hochander, *The Book of Esther in the Light of History*, 1923.

Estienne, family of Fr. printers, see STEPHENS.

Eston, urb. dist., 4 m. S.E. of Middlesbrough, with extensive blast furnaces, iron foundries, and steam sawing mills. The Cleveland iron-stone was first discovered here. Pop. 31,000.

Estonia, *Estivabariik*, *Estland*, or *Eesti-Maa*. The most N. Baltic prov. It was admitted to the U.S.S.R., Aug. 6, 1940. The is. of Dago, Oesel, and other smaller is. in the Baltic, form part of the ter. During the thirteenth century was under the sway of Denmark but in 1346 was handed over to the Teutonic knights. In 1561 it came under the rule of Sweden, and in 1781, by the treaty of Nystadt, Russia became its ruler, until, on the outbreak of the Soviet revolution, it became a republic. It has an area of about 18,000 sq. m., and is bounded on the N. by the gulf of Finland, on the S. by Latvia (q.v.), on the W. by the Baltic Sea, and on the E. by Lake Peipus and the R.S.F.S.R. The pop. (1939) was about 1,150,000 persons, of whom about 90 per cent are Estonians and the remainder Russians, with a small sprinkling of Gers. and others. The surface of the land is generally low and flat, and it is subject to great extremes of temp. The chief industry is agriculture and dairy farming, employing over half the workers, rye, oats, barley, flax, and potatoes being the chief crops, and butter, bacon, and eggs the chief dairy farm products. The most important manufs. are cotton, woollens, paper, matches, and distilling, and the Kreenholm cotton mills near Narva are among the largest in Europe. There is a univ. at Tartu (Dorpat), founded in 1632 and enlarged in 1802, and a technical univ. at Tallinn (1936). The cap. city Tallinn (Reval), with a pop. (1938) 146,400, is an important Baltic

port connected by railway with Leningrad; other tns. are Tartu (60,000); Narva (25,000); and Parnu (21,000), on the gulf of Riga.

A new constitution came into force in 1938, replacing an 'authoritarian' regime under which E. had been ruled since 1934. All political parties were abolished and the Diet replaced by 'corporations' (see CORPORATIVE STATES). The only political organisation was then the 'popular front,' which was created by the gov. to support the new constitution. E.'s position, like that of the other Baltic States (see BALTIC STATES) grew hazardous as the international situation deteriorated, it being obvious that they were but pawns on Russo-Ger. chessboard. In Oct. 1938 E. introduced a neutrality law modelled on that of the Scandinavian states. This was followed in June 1939 by a non-aggression pact with Germany simultaneously with that country's pact with Latvia—pacts which at once moved Russia to 'guarantee' Estonian independence—an offer which E. rejected. Trouble soon came when the Gers. invaded Poland, Russia charging E. with harbouring in their waters Polish submarines which, it was alleged, had attacked Russian steamers. The sequel was a pact of mutual assistance in which Russia was granted the right to estab. naval and air bases on Estonian ter. Soviet troops crossed the border and warships entered Tallinn harbour. The Ger. reaction to this move was to 'reparatize' the Ger. minority of some 16,000 persons whose ancestors had dwelt in E. for generations. In 1941 E. was occupied by Ger. forces, but early in 1944 the Russians were driving rapidly westward toward the Estonian border; by mid-Sept. one section of Gen. Govorov's forces struck the W. shore of Lake Peipus while another converged on Tallinn, which city fell to the Russians on Sept. 22 and the subsequent fall of Baltiski and Parnu led to the evacuation of the country by Ger. troops. During the first year of Russian occupation (1940) nearly 61,000 Estonians were killed, arrested or deported to Siberia. Later under Ger. occupation came compulsory mobilization, which was defied, and ruthless conscription for forced labour. Thousands were sent to concentration or slave labour camps. In the autumn of 1941 the Baltic States' tragedy reached its climax with the second Russian occupation. Hundreds of thousands of Balts fled to Germany, Poland, Czechoslovakia and Austria and to-day a great many of these are to be found in the Displaced Persons' camps of W. Germany. Forced collectivisation of farms has deprived an essentially individual people of their inheritance. In early 1948 there were seventy collective farms in E. now there are 300. See A. Pullerits, *Estonia, Population, Cultural and Economic Life*, 1937; B. Newman, *Baltic Roundabout*, 1939, and *Baltic Background*, 1948; F. W. Pieck, *The Baltic Nations*, 1945; J. H. Jackson, *Estonia*, 1948. See EASTERN FRONT, OR RUSSO-GERMAN CAMPAIGN IN SECOND WORLD WAR.

Estoppel, the legal term which is applied to anything which prevents a person from denying or confirming a fact on account of his own actions. The three kinds of E. are: (1) Those of record, which prevent either of the parties from offering any statements contrary to the recorded judgment; (2) E. by deed, which prevents a man from denying any statement made by him in a written deed; (3) E. in pais or by conduct, which includes such instances as a tenant's inability to deny his landlord's title, once the tenant is in possession.

Estovers, term applied to the supplies of wood which a tenant has the right to take for purposes of fuel or repair from the estate on which he lives.

Estrays, animals which are not wild but are found wandering without an owner in any public place or on some one else's property. They become the temporary property of the lord of the manor if found within the confines of a manor, or if in any other place, they become subject to the Crown. Should they not be claimed within a year and a day this proprietorship becomes permanent.

Estreat, term in Eng. law applied to a true copy of some writing, particularly a fine or amercement entered in the records of a court of law. It is also applied to recognisances when the conditions of the latter are not kept. Under these circumstances only are recognisances estreated, and the parties are considered as debtors to the Crown.

Estrees, Gabrielle d' (1573-99), daughter of the Marquis Antoine d'E., and mistress of Henry IV. of France. She married Nicolas d'Amerval, Seigneur de Liancourt, but she left him on account of her preference for Henry. The latter, it is said, wished to divorce Marguerite de Valois and to marry Gabrielle, but her sudden death prevented the carrying out of his plans.

Estrella, Serra da, mt. range of Portugal, stretching from the S.W. to the N.E. for about 75 m. through the old prov. of Beira. It is a granite range and culminates in Mahão, 6,540 ft. high.

Estremadura: (1) Originally a prov. of Portugal, now the dists. of Santarém, Leiria, and Lisbon. The Tagus divides the dist. into two parts, the N. one being mountainous. The chief products are wheat and wine. The chief tns. are Lisbon and Setúbal. Area about 6,937 sq. m. Pop. 1,379,500. (2) Anct. dist. of S.W. Spain, now occupied by the two provs. of Badajoz and Cáceres. Area about 16,000 sq. m. Agriculture is very little attended to, but the people are engaged in breeding domestic animals. There are also copper, silver, and lead mines. Pop. 1,258,600.

Estremoz, tn. in the prov. of Alentejo, Portugal, situated to the N.E. of Évora. Pop. 5,000.

Estuary (Lat. *æstuarium*, from *æstus*, the tide), an inlet of the sea at the mouth of a riv. where the water of the riv. and the sea meet, and the fresh and salt are mingled. The riv. seeks an exit in the sea, and the tide flows in towards the riv.,

so that some estuaries are subject to tidal waves of great force.

Ezek or Easag (Osjek), tn. of Yugoslavia, situated on the R. Drave, about 13 m. from its junction with the Danube. It is a trading centre and manufs. silk and flour. It is built on the site of the Rom. tn. of Mursia. Pop. 40,300.

Etah: (1) Dist. of India, in the United Provinces. Area about 1740 sq. m. Pop. 828,000. (2) Eskimo settlement, situated on Smith Sound, Greenland.

Etampes, tn. in the dept. of Seine-et-Oise, France. It is interesting on account of its old churches, tn.-hall, and castle ruins. Pop. 10,400.

Etaples, watering-place and fishing port in the dept. of Pas-de-Calais, France, situated near the mouth of the Canche R., about 15 m. S. of Boulogne. Its antiquities bear testimony to its importance in Rom. times, while in the Middle Ages it was noteworthy. A treaty was signed here in 1492 between Henry VI. of England and Charles VIII. of France. E. was severely damaged in the First World War. Pop. 6800.

Etaples, J. Lefèvre d', see FABER, JACQUES.

Etawah, cap. of the dist. of Etawah, United Provinces, India, situated on the l. b. of the Jumna in a picturesque locality. This tn., which is an important trading centre, contains many fine streets, Hindu temples, and steps or ghats leading down to the riv., affording facilities for the pilgrim's ablution. Pop. (tn.) 42,000.

Etching, the art of engraving by eating into the metal with a mordant. The so-called 'Dutch bath' (hydrochloric acid and potassium chlorate), dilute nitric acid, or a solution of perchloride of iron is the mordant commonly used. A thin layer composed of gums, waxes, and resins is spread over the metal plate to form the 'etching-ground.' One method of applying the ground is as follows. The gums, etc., are squeezed into a ball covered with silk. If the heated copper is brought into contact with the ball, the composition oozes through the silk, and as it melts, may be spread over the plate with a silk pad or dabber. Usually the etcher holds the ground over a flame so as to blacken it with smoke. The object of this is to show up the lines he opens. If he wants to transfer a design, all he need do is to cover a thin sheet of paper with chalk and then trace over the design on the paper, when it is laid upon the copper plate. When the drawing is indicated on the ground, the plate is immersed in the acid bath, and the mordant 'bites' into the lines. After the most delicate strokes are sufficiently etched, the plate is taken out and these strokes are filled up with a stopping-out varnish, like Brunswick black. This process of immersion in the bath and stopping-out the lighter gradations is continued until the acid has bitten in sufficiently to make the blackest lines. If he likes, the etcher can proceed in a different way. At first he uses his needle to open only the darkest lines and then dips his plate into the mordant so as to

get these partly bitten. He next draws in the parts which are to be a shade lighter, and allows the acid to corrode these. This process is persisted in till he comes to the lightest parts. It will be seen that the corrosion is in proportion to the depth of tone required. If a soft ground E. is required, that is one imitating the texture of a crayon drawing, tallow is mixed with the E. ground and the design is firmly traced through a sheet of paper, when the grain of the latter and the kind of pencil used will leave their mark.

History.—Albrecht Dürer was a pioneer in this field and etched his 'The Cannon' upon iron. Van Dyck (1599–1641), who was 'the solitary great etcher' of the Rubens school, depended for his splendid effects on the use of the open line and vigorous, dotted work, and aimed always at broad effects. Rembrandt (*d.* 1669), on the other hand, who is the perfect 'painter-etcher' relied on close-hatching, and discovered how, by leaving ink on the surface of the copper, he could cope with the difficult task of reproducing the chiaroscuro of his paintings and ensure a rich and liquid surface tone. His etchings embrace portraits, landscapes, and religious themes, 'Christ with the Sick around Him, Receiving little Children,' being widely accepted as his masterpiece. Other and notable painter-etchers of Holland were, Adriaan van Ostade (1610–85), Paul Potter (1625–54), and Nicolas Berchem (1683). In the eighteenth century the It. school of etching reached its high-water mark in the delicate 'Capricci' of Giovanni Tiepolo (1693–1770), and the architectural designs of Piranesi (1720–1778). A school of satirical etching developed in England. Hogarth (1697–1764) etched his own paintings, such as the 'Rake's Progress,' whilst Thomas Rowlandson (1756–1827) illustrated the story of Dr. Syntax and the *Vicar of Wakefield*, and proved himself a brilliant caricaturist. George Cruikshank (1792–1878) may well be mentioned in connection with Rowlandson, as he has won universal favour by his sympathetic interpretation of Dickens' odd characters. Early in the nineteenth century (1807–19), appeared Turner's *Liber Studiorum*, which contained some excellent plates of his own as well as the etchings of a number of less famous engravers. Francisco Goya (1746–1828) is the finest Sp. etcher; his power to seize upon all hypocrisies and affectations is well exemplified in his 'Caprichos,' whilst his 'Desastres de la Guerra,' are remarkable, if almost repulsive, expositions of the terrors of war.' In the last century the work of Eugène Delacroix (1799–1863), and of A. Decamps (1803–1868), did much to revive the art, which in some respects seemed to have grown stagnant. Other notable Fr. etchers were A. Legros (1837–1911) and C. Meryon (1821–1868). But the greatest etcher of the day was probably the Amer. J. A. McNeill Whistler (1834–1903), whose charming and exceptionally individualistic work is seen at its best in 'Battersea,' and the 'Venice set.' In recent years E. has been favoured greatly by prominent Brit. artists such as

Sir D. Y. Cameron, Frank Brangwyn, Walter Sickert and Sir Muirhead Bone. See also ENGRAVING; PHOTOGRAPHY; PROCESS WORK.

Etching of Crystals is achieved artificially by subjecting crystals to the action of such solvents as caustic alkalis or acids, although rock salt often becomes etched by a natural process. This salt, being deliquescent, becomes coated, after crystallisation, with a layer of water. In course of time tiny rectangular depressions are formed all over the surface. When a crystal is immersed in some solvent 'etch figures' are formed. The crystallographer frequently uses the etching marks to assist him in his classification of a certain piece of crystal; for they are found to be closely related to its crystallographic form.

Eteocles, in Gk. mythology, was the son of Œdipus and Jocaste. He, with his brother Polyneices, succeeded to the throne of Thebes on the flight of their father. They undertook to rule in turns, but could not agree over this arrangement, which led to the flight of Polyneices to the court of Adrastus to obtain vengeance. The result of this was a war known as the Seven against Thebes, which figures largely in Gk literature. In this war E. and Polyneices met in combat and killed each other. This story is told in *The Seven against Thebes* by Æschylus. See also EPICONT.

Eternal Punishment, see HELL.

Etesian Winds are those which are prevalent, during summer, over the S. part of Europe. Their direction is N. across the Mediterranean Sea to N. Africa, and they seem to be caused by the rising of the heated air over the Sahara and the consequent influx of cooler air to replace it.

Étex, Antoine (1808–88), celebrated Fr. sculptor, architect and painter, *b.* in Paris. Studied sculpture under Dupaty and Pradier, painting at the Ingres School, and later, architecture under Duban. In 1829 he took the second prize for sculpture at the School of Fine Arts, with his 'Hyacinthe mourant.' He also won in the same period prizes for a painting of a nude bather shown in the Lebrun Gallery, and other awards. His chief work is that which he was commissioned by the Fr. Gov. to do for the Arc de Triomphe and the colossal groups on the rear face of the Arc. These groups represent the *Resistance* of France to the coalition of 1814, and *Paix*, 1815, but though impressive, suffer to some extent by such close juxtaposition with 'La Marseillaise,' the masterpiece of Rude, which is to be seen on the opposite side. Other fine pieces of E. include a marble figure, 'Olympia,' inspired by Ariston and now at Trianon, and a marble group of 'Hero and Leander,' now in London. His work was, however, criticised by G. Planché, as lacking in simplicity, though revealing all the secrets of the art. Pubs. include *Étude sur la vie et les ouvrages de J. Pradier* (1859); *L'Institut et l'Académie des beaux-arts* (1860); *Les Trois Tombeaux de Gérardin* (1885) and a biography *Les Souvenirs d'un Artiste*, 1877–87.

Ethal, also called **Cetyl Alcohol**, for it seems to be the hydroxide of a radical called cetyl. It is a solid, transparent, white crystalline mass, which melts at about 50°C. , and is contained in spermacetti.

Ethane (C_2H_6), a gas composed of hydrogen and carbon, is contained in the gas which rises from the earth. It is colourless, without smell, and will burn in air with a luminous though pale flame, and is insoluble in water. E. is the second number of the paraffin series, the first being methane or marsh-gas (*q.v.*).

Ethelbald (*d.* 860), king of Wessex, second son of Ethelwulf. He rebelled against his father and took the kingdom, leaving him only Kent (856). E. ruled well, putting Danes to flight. He married (858) Judith, his father's widow, and at the instigation, it is said, of St. Swithun, he left her.

Ethelbert (*c.* 552-616), fourth king of Kent, succeeded his father Ermeric in 560. His marriage with Bertha, daughter of Charibert, king of the Franks, led indirectly to St. Augustine's mission, and by him E. was converted to Christianity in 597, and he in his turn influenced thousands of his subjects to turn Christian. He destroyed pagan temples and built churches, and also estab. the first written Saxon set of laws. This brought about a rebellion under Redwald which was successful.

Ethelbert (*d.* 866), third son of Ethelwulf. By his father's will he was to have Kent as under-king. On the death of Ethelbald he took the whole realm (860), contrary to his father's will, which had named Ethelred.

Ethelbert, or Albert, Saint (*d.* 794), king of E. Anglia during the Mercian supremacy under the rule of Offa. Offa's wife was afraid that E. would marry their daughter Alfrida, and possibly supplant her husband, so she prevailed upon Offa to have E. put to death.

Etheldreda, Saint (*c.* 630-*c.* 679), abbess and founder of the religious house of Ely. She was married twice, but preferred the religious life, and so withdrew from married life into a convent. She was also known by the name of St. Audrey, the origin of the present word *laundry*, originally applied to a cheap kind of lace purchasable at St. Audrey's Fair.

Ethelfleda (*d.* *c.* 919), daughter of King Alfred, and the wife of the earldorman of Mercia. She was successful in helping to subdue the Danes, and on the death of her husband (*c.* 912) assumed the rule over his lands. She had the title 'The Lady of the Mercians.'

Ethelfrid, or Ethelfrith, king of Northumbria (*d.* 617), son of Ethelric. Having succeeded in 593, he gained a victory over the Britons of the N. at Dawstone in 603. In 617, however, he was defeated and slain in a battle against Redwald of E. Anglia.

Ethelred I. (*d.* 871), king of the W. Saxons. He was the son of Ethelwulf and elder brother of Alfred. It was in his reign that the Danes first attempted to make settlements in England. He con-

quered them at Reading and Ashdown, and was conquered by them at Merton, where he was fatally wounded.

Ethelred II. (968-1016), surnamed 'the Unready' (lacking in 'redo' or counsel). He succeeded his half-brother, Eadward the Martyr (978). At first he tried to repulse the Norsemen by bribery, but finally he massacred the Danes (1002) in time of peace in a brutal manner, which led Sveyn to gather a large force to avenge the slaughter, when E. was conquered and obliged to flee to Normandy, his father-in-law being the duke. He was recalled by his former subjects in 1014, which was the year of the death of Sveyn.

Ethelred, St., see Alfred.

Ethelwold, St., bishop of Winchester (963-984), b. during the first quarter of the tenth century. He was the companion and helper of St. Dunstan, and these two together, with the king's authority, helped to reform the monasteries, replacing the canons by monks, and enforcing the rule of celibacy.

Ethelwulf, ruler of Wessex and Kent (*d.* 858), the son of Egbert. He succeeded to the throne in 839, and his reign was occupied with constant incursions of the Danes, by whom he was defeated at Charmouth about 842, and over whom he was successful a few years later at Ockley.

Ether, in physics, see ETHER.

Ether waves (radio), a name sometimes given to the systems of moving electric and magnetic forces under which are included the electro-magnetic radiators known as X-rays, heat, light and wireless waves. A single E.W. is one complete cycle of change of state in the medium. See ETHER.

Ether, Ethyl Ether, or as it was formerly called, **Sulphuric Ether** ($\text{C}_2\text{H}_5\text{O}$), is prepared by the so-called 'continuous process,' by the action of sulphuric acid on ordinary alcohol: 9 parts of concentrated sulphuric acid and 5 parts of alcohol are heated to 140°C. in a retort, whereby ethyl hydrogen sulphate is formed ($\text{C}_2\text{H}_5\text{OH} + \text{H}_2\text{SO}_4 = \text{C}_2\text{H}_5\text{HSO}_4 + \text{H}_2\text{O}$). A slow stream of alcohol is then run in, which reacts with the ethyl hydrogen sulphate to form E. ($\text{C}_2\text{H}_5\text{HSO}_4 + \text{C}_2\text{H}_5\text{OH} = (\text{C}_2\text{H}_5)_2\text{O} + \text{H}_2\text{SO}_4$). The sulphuric acid which is regenerated reacts with more alcohol according to the first equation, and so the process may be regarded as 'continuous.' At least, until the water formed dilutes the sulphuric acid to such an extent as to render it ineffective. The crude E. which distils over is washed with caustic soda solution, the top layer containing the E. being dried over lime and redistilled. E. is a colourless, mobile and volatile liquid, with a peculiar smell, it is lighter than water (sp. gr. 0.72) and boils at 35°C. It is somewhat soluble in water, and readily dissolves fats, resins, and oils, for which purpose it is largely used in the arts. E. is very inflammable, burning with a somewhat luminous flame, and forming an explosive mixture if its vapour is mixed with air. Chemically it is stable and not readily reactive. Owing to its low boiling point (below blood heat) it vaporises so

rapidly in the air as to produce intense cold. Use is made of this in some freezing machines, and also in producing local anæsthesia by freezing. Medicinally it is also used as a heart stimulant, in small quantities; and more generally as an anæsthetic when inhaled, for which purpose it is safer than chloroform, though accidents have frequently occurred owing to its great inflammability.

Etherege, Sir George (c. 1635-91), dramatist, was a man in easy circumstances, who wrote plays merely to amuse himself, in those hours that he could snatch from the pleasant saunterings of a man about in. He wrote three comedies: *The Comical Revenge, or Love in a Tub* (1664), *She Would if She Could* (1667), and *The Man of Mode, or Sir Fopling Flutter*, (1676). These plays had wit, but their indecency was such as to bring upon them the censure of Steele, though in this respect they were no whit worse than those of many of his contemporaries. Shortly after the production of his last comedy he was knighted, though why this honour was bestowed upon him has not transpired. He was sent as minister to The Hague by Charles II., and by James II. in 1685 to Ratisbon, where his private conduct was disgraceful and his diplomatic value nothing. His works were collected and ed. by A. W. Verity (1888), and H. F. B. Brett-Smith (1927 f.). See lives by V. Meindl, 1901 and F. S. McCamie, 1931.

Ethers, or Alkyl Oxides, class of compounds of which ordinary or Ethyl E. (q.v.) is the best known. They are related to the metallic oxides in the same way as the alcohols are to the hydroxides. Their formulae may be represented by ROH^1 , where R and R^1 are two hydrocarbon radicals. They are prepared by the action of the alkyl halides on silver oxide, or of the alkyl hydrogen sulphate on the alcohol, and in other ways. Chemically the Es. are neutral, inert bodies varying from volatile liquids to waxlike solids. The term E. is often applied to esters, which may be regarded as Es. in which one of the radicles is of an acidic character.

Ethical Societies. At the end of the nineteenth century E. S. to promote the study and application of ethical principles without theological commitment were formed, first, in America, and then elsewhere, mainly in Britain, Germany, and Austria. The headquarters of the Brit. societies is The Ethical Union, Incorporated, 4a Inverness Place, London, W. 2. The Union publishes a monthly journal *News and Notes* and a quarterly *The Plain View*, and initiates social research, public conferences, summer schools, lecture courses, and pubs., in furtherance of its object, that is, the improvement of human relations and the quality of living on a humanist basis. For more than forty years the Union has been specially interested in the moral aspect of education, and its pubs. in this field have been officially recognised and used. In addition, the Union supports and promotes the formation of local groups. Presidents

of the Ethical Union have included: J. A. Hobson, L. T. Hobhouse, Graham Wallas, Gilbert Murray, G. P. Gooch, H. N. Brailsford, and Sir Richard Gregory.

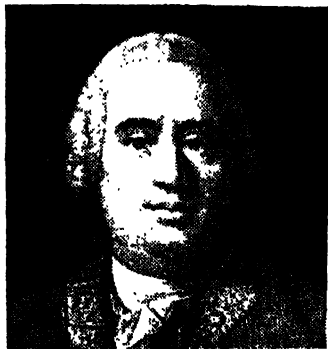
Ethics, the science which deals with human character and conduct, not considering them in the light of their own nature, but in respect of the moral judgments which have been diversely passed upon them. Like logic, therefore, it is a universal and practical science, dealing with elements common to the whole of the human race. This definition will at once show its intimate relations both with psychology and sociology, though it is noteworthy that the anc. philosophers all regarded ethical questions from the individual rather than the social standpoint. But although E. and psychology are closely related, there is a clear distinction between them which may be shortly expressed by saying that while psychology deals with the explanation and analysis of mental processes, and with the world as it is, E. concerns itself with the judgments, either condemnatory or laudatory, passed on these processes and their resultant actions, with the world, not only as it is, but also as it ought to be. An ethical bearing is thus pre-supposed for the many psychological questions which come under discussion in E. Thus we have the question of the nature of volition itself, and the relation of will and character, which is considered substantially apart from the various acts of will which go to form it and which result from it. Character has been defined, indeed, as 'the habit of the will.' Then come the questions of Hedonism, conscience, and the freedom of the will, and among modern writers the question of the relation of the social life to E. E., as we have seen, deals with two subjects which are inseparably related: (1) Character, in relation to which it investigates the nature of duty and virtue; (2) conduct, in relation to which it attempts to differentiate between the various virtues and vices, and to discover the extent and range of obligation. Thus E. is seen to deal not only with the problems of action as they exist, but also the more critical question of the principle or principles by which conduct should be regulated. The basis of E. is, indeed, the search for the *summum bonum*, the quest of man's highest good. It is by their varying conceptions of this highest good that the various schools are chiefly differentiated.

Thus, broadly classifying, we distinguish two great schools, the hedonistic and the rationalistic, to be found among both anc. and modern thinkers. The *Pyrronics* and *Stoics* were rationalists, that is to say, they held the life of virtue or reason to be the sought-for end, beside which nothing is to be considered. But Socrates, before this, when attempting to define virtue, had found himself compelled to do so in terms of pleasure. The chief good must also be the greatest happiness. Emphasis is laid on this by the hedonistic schools of *Cyrenaics* and *Epicureans* (see *EPICUREANISM*), where virtue is considered as leading to the highest pleasure, or, to

use the Aristotelian term, *eudaimonea*, somewhat misleadingly trans. happiness by modern ethicists. With Plato and Aristotle the Socratic view is kept in its entirety and explained in a still deeper sense, and it is thus found that hedonism takes a lower place. Plato, indeed, in certain of his dialogues, explicitly condemns it. Aristotle taught that the highest good for any being is the perfect development and full exercise of its function; and since man is differentiated from the lower animals by reason, it is in the development of his moral and intellectual abilities that his end consists, the life of virtue and knowledge. The life of virtuous activity is subordinate and inferior to the life of the philosopher. It will be seen from this explanation that the Gks. treated of E. mainly from the individualistic standpoint, though the relation of E. to politics is not ignored. The scholastic philosophy, based as it was on Aristotle and his commentators, did not materially alter this view, save that in the latter the contemplation of the Deity was not explicitly propounded as man's final end and *summum bonum*. E. was brought into close union with religion, and the conception of duty was that of obedience to the commands of God. Later, however, attention was chiefly devoted to casuistry, and instead of new theories on the subject being broached, energy was chiefly expended in the application of the principles and recognised laws to conduct under all possible variations of circumstances. E. shared, however, in the new birth of the Renaissance, and the doctrine of Utilitarianism took its rise.

Utilitarianism, called also Universal Hedonism, in contrast to the Egoistic Hedonism of the Epicurean schools, is essentially social in its attitude. We have already remarked on the development of the doctrine of pleasure by Epicurus, and this conception had not been wanting from the scholastic system, for here the consideration of reward and punishment went always side by side with the consideration of obedience and disobedience to duty, of virtue and of vice. The Utilitarian philosophers frankly took up again this view, but with them it was the pleasure of the greatest number, rather than of the individual, that was to be sought. Now, too, a definite attempt was made to estab. E. on some basis other than the theological, but the idea of rewards and punishments still survives to a large extent. Hobbes and the naturalistic school founded their E. on the natural results of human action. E. to them was the codification of the results of actions according as they finally gave pleasure or pain. As this conception becomes more and more altruistic, we see that virtue becomes equivalent to utility, and so the successors of Hobbes are commonly known as the Utilitarian school. A somewhat similar view, though expressed in the language of rationalism, was that of Cumberland, who, in his *De legibus Naturæ* (1672), gives 'the common good of all' as the final end, though he expresses

'good' in terms of perfection as well as of happiness. Many ethicists of the following period, such as Shaftesbury and Butler, make use of similar phraseology. But it was in David Hume (1711-76) that the Utilitarian school found its first capable exponent, almost, one might say, its founder. Virtue he defined as the quality which an onlooker approves, and vice as that which the onlooker blames. With this as his basis, he proceeds to examine the virtues and vices, showing that in every case that quality is approved which is useful or directly agreeable. Thus utility becomes the sole criterion of virtue.



DAVID HUME

Wm. Paley, in his *Moral Philosophy* (1785), though taking his stand on the basis of Christianity, was a notable exponent at a later period of the utilitarian principle. The period of the Fr. Revolution was one of considerable activity in this dept. of thought, and here again Utilitarianism is the main principle.

Jeremy Bentham widely extended the sphere of its operation, and caused the complete reunion of E. and politics, by applying it to the latter of these. The names of Ricardo and J. S. Mill are even more important. The latter was principally occupied in the defence of his theory, rather than in its exposition, for Bentham's works had evoked a large number of attacks. All these writers regarded man as a social being, and insisted on the fact that the most necessary virtue was benevolence or unselfishness, but it was objected that no reason was ever given why the advancement of the general happiness should be the duty of the individual. Paley, as we have seen, met this objection by theological motives, while Bentham did so by regarding the community as the unit. But no truly satisfactory proof of the principle has yet been adduced. Meanwhile, though Utilitarianism was the more prominent, Rationalism also appeared in various forms, as interpreted by the Cambridge Platonists and the eighteenth century

Intuitionist school, of which Joseph Butler may be regarded as the founder. It regards conscience as the final judge of actions, but its weakness lies in the failure to give a complete definition of conscience. The ethical system of Emanuel Kant, given to the world chiefly in his *Groundwork of the Metaphysics of Morals* (1785) and the *Critique of Practical Reason* (1788), was an attempt to clear away the many difficulties of the intuitionist system. Thus, through the transcendentalism of Germany, came into England the ethical idealism which has exercised so powerful an influence on the development of Eng. thought in every dept. of philosophy during the past century.

The question may be asked whether E. is the sort of subject which a professional moral philosopher can discuss in a spirit of nearly sceptical detachment. This detachment, though proper for the professional moralist in the academic exposition of E., does raise a real moral problem for him as a human being, and also as a teacher. For as a teacher he may be called upon to say something about principles on which he decides between right and wrong; he must try to say how questions of decision arise in his professional work; and ultimately he must admit that intellectual integrity is something at least partly moral in character. In order to teach E., a professional moral philosopher must care about the difference between right and wrong, between good and evil. No serious moralist can, ultimately, be satisfied with the philosopher who avers that questions concerning the meaning and end of human life signify nothing. In this context Butler in his *Dissertation on the Nature of Virtue*, raised the question of whether goodness consists simply in a general concern for human welfare. This, as he saw, was the attitude of the reforming sentimentalists. It is no doubt hard to distinguish charity from sentimentality and it is hard for the same reason to distinguish tolerance from intellectual indifference; and even the honest intellectual is in danger of repeatedly confusing these opposites. See the works of the ethicists referred to in the text, and also H. Spencer, *The Data of Ethics*, 1879 (part 1 of *Principles of Ethics* in 2 vols. completed 1893); T. H. Green, *Prolegomena to Ethics*, 1883; H. Sidgwick, *Outlines of the Hist. of Ethics*, 1886; C. E. Moore, *Ethics*, 1912; A. Schweitzer, *Kultur und Ethik*, 1923; A. Dyroff, *Religion and Moral*, 1925; E. Brunner, *Das Gebot und die Ordnungen*, 1932; W. Lillie, *An Introduction to Ethics*, 1948. See also COMPARATIVE ETHICS.

Ethicus, or **Æthicus**, reputed author of a cosmography, and also perhaps of a fable, though less ambitious, work, entitled *Alia Totius Orbis Descriptio*. Internal evidence, such as the mention of the gate of St. Peter in Rome, and of other signs of Christian supremacy, assigns the cosmography to the latter part of the fourth century. It is mentioned by Isidorus of Seville (seventh century) and other writers, and in abridged form of the second book is found in Orosius. The

compendium is an abstract of anct. geographical lore, and may well have been put together from the results of the survey undertaken, at the instance of Julius Cæsar, by the three geometers, Polycaetus, Zenodotus, and Theodotus.

Ethiopia (Abyssinia) (Gk. *Aiθiopia*, the 'Kush' of the Bible), classical name for a part of N.E. Africa, confined on the E. by the Red Sea, and to the N. by Egypt. The provs. of Abyssinia, Kordofan, Sennaar, and Nubia roughly cover the anct. E. The etymology of the word is unknown, although it may well be Egyptian, but the Gks., with their passion for derivations, referred it to two words *aitō*; and *ōph*, and said it meant 'swarthy faced.' Homer refers to the 'blameless Ethiopians,' whom he thought of as the men dwelling far away on the furthest borders, and tells how the gods went to their banquets. Herodotus recounts with evident delight a number of fairy tales about E., which he gathered from Egyptian priests. Thus, he divides the country E. and W. into the lands of the straight-haired and woolly-haired races, and discourses at some length on the elephant- and fish-eaters, the tortoise- and serpent-eaters, the Troglodytes ('dwellers in caves'), and the Blemmyes ('hideous men'), etc. Originally occupied by independent tribes, it became an Egyptian prov. under the eighteenth dynasty, and paid tribute in negroes, ivory, gold, etc. During the eleventh century B.C. E. was formed into an independent kingdom with the cap. at Napata. In 750 B.C. she was so strong that Egypt was obliged to acknowledge her yoke. When Egypt successfully rebelled in 660, the Ethiopians continued free till the Persian conqueror, Cambyses, forced them in 530 to recognise his rule. The is. of Meroë, famous for the oracle of Jupiter Ammon, now became the cap. In the course of the third century B.C. Ergamenes destroyed the theocratic gov. and estab. a military domination in its stead. Meroë fell before the armies of Augustus when Queen Candace was counted among his victims. The great city of Meroë was a ruin in Nero's day, and in the sixth century its kingdom was supplanted by Christian Nubia. From the first century A.D. up to about 1000 the so-called Axumite dynasty reigned at Axum, and this was succeeded by another Christian power, that of the Zagwes. From about 1300 the hist. of modrn Abyssinia (*q.v.*) begins. Scanty Egyptian stele and records, and a few Ethiopic, trilingual, and Sabaean inscriptions, are almost the only sources of Ethiopic hist.

Ethiopic Enoch, see ENOCH, THE BOOK OF THE SECRETS OF.

Ethiopian Languages, **Thē**, were spoken by the Ethiopians who from very early times inhabited parts of N. Africa. The language which they used up to the fourteenth century, and which remained the language of writing and the church, was the 'Lesana Ge'ēz.' The word 'Ge'ēz,' which means 'free,' or perhaps 'migration,' itself suggests the truth, namely that this tongue is a development

of a foreign one—in this case Arabic—the actual alphabet of twenty-six letters being directly borrowed from Sabeen or S. Arabic. There are seven vowels, represented by hooks, which cannot be written without their consonants. Two dots separate adjoining words, and all the letters are disconnected. No other Semitic dialect has so flexible or elaborate a syntax. It was written from left to right and contains a number of words in common with Aramaic, Heb., Gk., and the African dialects. For speech the Ge'ez was superseded by the Amharic.

Ethmoid Bone ('sieve-like') is somewhat spongy in texture and cubical in form. It lies at the root of the nose between the two orbits of the eye sockets, and is one of the constituent bones of the cranial box, the orbital plate of it being situated immediately behind the lacrymal bone.

Ethnography. See ANTHROPOLOGY—*Ethnography*; ETHNOLOGY.

Ethnology. E. and Ethnography are primarily sciences which deal with man as a racial unit, and with the distribution over the earth of racial units. The word 'Ethnology' has a somewhat vague connotation, but is, more particularly, defined by Thomas Huxley as 'that science which determines the distinctive characters of the persistent modifications of mankind; which ascertains the distribution of those modifications in present and past times, and seeks to discover the causes, or conditions of existence, both of the modifications and of their distribution.' It is, therefore, as he points out, a branch of anthropology (*q.v.*), which in its turn is a branch of zoology (*q.v.*), one of the natural subdivisions of biology (*q.v.*). It also touches philology, psychology, and sociology. E. again may be said to 'treat of the various large and small groups of human beings distributed over the face of the earth, and describe their mental, moral, and physical characteristics' (Haberlandt). All communities which have existed, whether still existing, or having become absorbed in conquering or neighbouring tribes, or, having lost one of their most distinguishing features—their language—for that of another people, are considered under *Historical* or *Paleo-Ethnology*. Beyond this period of tradition, however, there are evidences of human groups, and this gives rise to the study of *Primitive History*. (See Dr. M. Hoernes' *Primitive Man*). It is possible to classify races according to languages, physical features, or according to culture. By classifying according to physical marks, like the colour and quality of skin and hair, we arrive at an anthropological div. Classifying according to culture gave rise to an obsolete method of classifying according to civilisation. By this method the races were divided into hunters, breeders of cattle, and agriculturists. All these methods, however, while possessing their own particular advantages and disadvantages, commonly suffer from the fact that they often separate related classes and *vice versa*. *Ethnography*, or *Descriptive Ethnology*,

however, uses the divs. of the earth and its natural configuration, and these are found to correspond in general to the fundamental divs. of the human race. (Ethnologists now divide the human race into four main groups: the *Ethiopian* or *negro*, the *Mongolian* or *yellow*, the *American*, and the *Caucasian* or *white*.) So we may proceed along this line studying the various historical and other connections of the race, while using any distinctions that language, structure, or culture may give us.

The science of E. is comparatively modern, because, although a vague knowledge of foreign lands and races has always been possessed, it is of comparatively recent date that the discovery of lands has been practically completed, so enabling us to take a survey of the whole earth. In the Middle Ages the science was not expanded greatly, although men like Marco Polo and Mendez Pinto, gained a knowledge of the Far E. Then dawned that period during which Columbus discovered the New World, so giving us access to a knowledge of the Peruvian and Mexican civilisations. This, which is sometimes known as the *First Period* of E., it is interesting to note, was passed amid such fierce fighting occasioned by the hunting of gold and animals and the exploiting of the new countries for their stored up wealth, that the natives of these countries became looked upon as possessing no feeling or intelligence. In fact a Papal Bull was required to decide that they were rational beings. The discovery of the is. of the S. Sea and of Australia by Capt. Cook marks the *Second Period* of E. The state of Europe at that time induced a desire for knowledge of other races, and their customs and culture. Rousseau, Johann Forster, and Voltaire stand out as leaders of this movement. As time passed China and India became more familiar, and the colonising efforts of the various European countries led to the discovery and study of the peoples, of the S. Seas and of S. and Mid-Africa. It is possible now to give a fairly complete description of the human inhab. of the earth, with their mental, moral, and physical characteristics.

Descriptive Ethnology or *Ethnography*.—According to an approximate calculation, the pop. of the earth is (1910) 2,174,000,000 of which it was dogmatically averred by ethnologists not more than four decades ago, that six-sevenths were civilised and one-seventh belonged to the lower orders. This conveniently divided man into races possessing hist. and those with none, and almost entirely agreed with the contrast between light and dark coloured races. But apart from the rapid spread of education over the globe which tends to stultify an *a priori* div. into civilised and uncivilised, research has yielded tolerably full hist. of the races and tribes of Africa much of which has been handed down by oral tradition. But it still remains true to say that the highest stages of form and culture appear in the N. hemisphere, which is the most favoured by nature and where, consequently, man is most widely

distributed. It may further be stated that in the N. hemisphere dwell the white races and the related Mongolians, while in the S. dwell the dark-coloured races. Anthropology (q.v.) divides man according to his physical qualities, such as colour of skin, quality of hair, and shape of skull. The hair is distinguished as ivory, smooth, woolly, curly, corrugated, and spiral, while the forms of skull are evolved from the comparison of height with length; in this manner three types of head are noticed: (1) Dolichocephaloi, or long; (2) mesocephaloi, or average; and (3) brachycephaloi, or short. The subdivs. of the races are continually changing according to the signs observed in them. According to the monogenetic view, mankind sprang from one primary form, which has since developed into species according to the influences of climatic and other forces. This view is far more generally held than the polygenetic theories. Neither the limits nor the distinguishing features of species can be regarded as fixed. Blumenbach, the founder of scientific anthropology and E., recognised five races: Caucasian, Mongolian, Ethiopian, Amer., and Malay, and of these the Malay is now regarded as being the result of a comparatively recent mixture in which the Mongolian element predominates while the Amer. may also be regarded as a remote branch of the same group. Thus we may reduce these divs. to the first three. Quatrefages, the Fr. anthropologist, attaches most importance to the colour of skin and form of the skull, and divides men into three races: white, yellow, and black, with two mixed races, viz. Amer. and Oceanic. Modern ethnologists would seek to eliminate the word race and classify either according to civilisations or according to domestic conditions. For fuller information and a classification of the races, see *Ethnology* by Haberlandt; J. L. Quatrefages, *Histoire des races humaines*, 1889; J. G. Frazer, *The Golden Bough*, 1890; E. B. Tyler, *Primitive Culture*, 1891; G. L. Gomme, *Ethnology in Folklore*, 1892-4; F. Ratzel, *History of Mankind*, 1896-98; A. Keith, *Nationality and Race*, 1919; G. Montandon, *La race—les races*, 1933; J. B. S. Haldane, *Heredity and Politics*, 1938. See also MAN; also ANIMISM; ENDOGAMY; EXOGAMY; FAMILY; MARRIAGE; POLYANDRY; POLYGAMY; TABU; TOTEMISM.

Ethyl, an alkyl, or organic radical, having the formula C_2H_5 ; which, although it does not stably exist by itself, forms part of many compounds, such as ethyl alcohol, ethyl ether, etc., in which certain properties of the ethyl radicals persist.

Ethyl Acetate, see ACETIC ETHER.

Ethylamine ($C_2H_5.NH_2$), a substance resembling ammonia in its odour and many of its properties. It may be obtained from coal tar, but is best prepared in a pure state by the reduction of methyl cyanide (acetonitrile). It is also formed, along with diethylamine ($C_2H_5)_2NH$), and triethylamine ($C_2H_5)_3N$), by the action of ethyl bromide or iodide on

alcoholic ammonia. E. is a colourless, volatile liquid, boiling at $18^\circ C$. It has a strong ammoniacal odour, and when in a dilute state is reminiscent of stale fish. It is very soluble in water to an alkaline solution, and with hydrochloric acid forms a salt which is deliquescent and soluble in alcohol, thus differing from the corresponding salt of ammonia.

Ethyl Carbinol, see PROPYL ALCOHOL.

Ethyl Chloride ($C_2H_5.Cl$) is obtained by passing hydrogen chloride into alcohol, in the presence of anhydrous zinc chloride, and condensing the product which passes over in a cooled receiver. E. C. is a colourless, ethereal liquid, boiling at $12^\circ C$., which is soluble in alcohol, and only sparingly so in water. It is used as a local or refrigerating anæsthetic in dentistry and minor operations, and also as a general anæsthetic in place of nitrous oxide.

Ethylene, or **Olefant Gas** (C_2H_4), a hydrocarbon prepared by heating alcohol with excess of sulphuric acid, whereby the ethylhydrogen sulphate, which is first formed, is broken up into E. and sulphuric acid. A better method is to pass the vapour of ethyl alcohol over heated alumina, the latter acting as a catalyst: $C_2H_5.OH = C_2H_4 + H_2O$. E. is a colourless gas with a faint ethereal odour, and is insoluble in water. It burns with a very luminous flame, forming carbon dioxide and water. Chemically E. is an 'unsaturated' substance, uniting directly with an equal volume of chlorine to form ethylene dichloride or 'Dutch liquid,' and also with bromine, hydrogen, chloride, sulphuric acid, etc. It is present in small quantities in coal-gas. E. is used to some extent as an anæsthetic, but more largely as an artificial ripening agent for oranges, grape-fruit, etc. It is also important as an 'intermediate,' i.e. a compound prepared not so much for direct use as for conversion into other compounds. 'Polythene,' an extremely useful insulating plastic, is prepared from ethylene by polymerization (q.v.).

Ethylene Alcohol, see GLYCOL.

Ethyl Ether, see ETHER.

Ethyl Formate, see FORMIC ETHER.

Ethyl Nitrite, see NITROUS ETHER.

Etienne, a family of Fr. printers, see STEPHENS.

Etienne, Church of St., see ST. ETIENNE.

Etienne-de-Baigorry, chief tn. of the valley of Baigorry, in the Basses-Pyrénées, France. There are copper and iron mines in the dist. Pop. 2200.

Etiolation, see BLANCHING.

Etiology, the consideration of the causes of disease. These are divided into: (1) Predisposing or remote, (2) exciting or proximate, (3) determining. The various causes act in different ways sometimes as remote, proximate, or determining: (a) *Age*. It is common knowledge that certain diseases are always regarded as children's ailments. (b) *Heredity*. The importance of this factor is apt to be confounded with the habits and customs acquired by children from their parents. (c) *Intermarriage*. This cause is so remote that it is more closely related to statistical

investigations than to practical medicine. (d) *Sex*. As anæmia and hysteria, more common in females than males. (e) *Temperament*. Some individuals are described as sanguine, others as phlegmatic, many, however, have the nervous temperament. (f) *Climate and locality, town, and country life*. (g) *Hygienic conditions*. Under this head, importance must be attached to occupation, air, previous disease, mental and moral states, physical conditions, temperature, diet, etc. All these factors must be borne in mind when considering the causation and prevention of disease.

Etiquette is derived from the O.F. *estiquette* 'a label,' another and closer Eng. derivative being 'ticket.' The *estiquette* seems to have been a kind of card of introduction, a meaning which offers some explanation of its later sense. The behaviour dictated by good breeding, the formal ceremonies prescribed by authority as appropriate to various social, court, and other official functions, and especially the observance of the rules of precedence, and to the other proprieties of rank and office, are all part of E., which may briefly be described as 'conventional decorum.' See also ADDRESS, FORMS OF.

Etiquette, *Madame*, see ANNA-ELIZABETH NOAILLES

Etive, a salmon riv. and sea-loch of Argyllshire, Scotland. The riv. rises on the Moor of Rannoch and finally is merged in the frith of Lorne. The loch into which it flows is some 20 m. long, and is a submerged valley noteworthy for its natural beauty.

Etna, flourishing industrial bor. of Allegheny co., Pennsylvania, U.S.A. It is a suburb of Pittsburg, 2 m. to the S., and lies on the W. bank of the Allegheny R. and produces iron, steel, brass, and enamelled ware. Pop. 7200.

Etna, or **Monte Gibello** (from Gk. *Αἴτω*, which comes from *αἶψα*, I burn), a volcano, 10,758 ft., in the prov. of Catania on the E. coast of Sicily. By rail the circumference of its base measures 86 m., and it is estimated to cover over 450 sq. m. In shape it is truncated cone, and has as many as 200 craters. On the W. side the symmetry of its slope is interrupted by a deep gully, 3 m. wide, known as Valle del Bove. The ant. geographer Strabo mentions the three distinct zones of vegetation. Most of the highest region, down to a level of 7000 ft., is barren except for some stunted Alpine shrub, and is usually covered in snow, besides scoriae and ashes. The next zone is the zone of forests, the upper part of which is covered with birch trees, whilst the lower reaches (up to 6000 ft.) are dense with evergreen pines and chestnuts. The lowest region, which extends up to about 3000 ft., has the splendid fertility natural to volcanic soil. Here olives, vines, and all kinds of vegetables flourish, and the slopes are dotted everywhere with populous cities and villas. From 476 B.C. there have been repeated and serious eruptions. Catania was overwhelmed by the eruption of 1169, and in 1669 a great abyss, 12 m. long, was

opened up in the side of the mt. See also POMPEII, HERCULANEUM.

Eton, tn. on the l. b. of the Thames, opposite Windsor, in Buckinghamshire, England. Pop. 3300.

Eton College, one of the most notable of Eng. public schools, was founded in 1440 by Henry VI. under the title of 'The College of the Blessed Mary of Eton beside Windsor,' but, in consequence of the political chaos, it was not completed till 1523. The first headmaster was Bishop



John H. Stone

THE QUADRANGLE, ETON COLLEGE

Waynflete. The original foundation consisted of a provost, ten priests, four clerks, six choristers, a schoolmaster, twenty-five poor scholars, and twenty-five infirm bedesmen, but, by the Public Schools Act of 1868, this was altered to a provost, ten fellows, who form the governing body, two chaplains, and seventy king's scholars or collegers. The number of pupils averages 1100. The 'Oppidans,' i.e. boys not on the foundation, form the great body of students. There are twelve vacancies a year for collegers, filled by selection. Until 1831 the education was purely classical, but in that year mathematics was introduced, and physical science was added in 1869. The Gothic stone chapel, with its rich and varied stained glass and its fine carving, is the chief architectural beauty of the college. Collegers live within the walls, but most of the boys live in masters' houses, which are built of brick and picturesquely grouped about the older buildings and

quadrangles. There is a special chapel for the younger school, a museum, and a fine library with a good collection of Oriental manuscripts. In 1908 King Edward VII. opened the much-needed school hall, and a domed octagonal library in memory of the Etonians who fought in the Boer War. There are also science schools, a school of mechanics and an observatory. Speech Day is celebrated on George III.'s birthday, June 4; there is an annual cricket match at Lord's between the school and Harrow, and on St. Andrew's Day the oppidans play the collegers at football. Twenty-four foundation scholarships at King's College, Cambridge, are reserved for E. boys, and there are, besides, several exhibitions and scholarships at both Oxford and Cambridge. Both Oxford and Cambridge rely much on Etonian oarsmen in their boat races. The eccentric custom known as 'Montem' was abolished in 1846. In the air raids of 1941 a bomb struck the Upper School, whose panels contained hundreds of names, some very distinguished, carved on the wood, and demolished the headmaster's room adjoining. Another bomb struck Savile House in Weston's Yard, the seventeenth-century house of the precentor. See W. L. Collins, *Etoniana, Ancient and Modern*, 1865; H. C. Maxwell-Lyte, *A History of Eton College*, 1440-1910, 1873, 1911; A. Clutton Brock, *Eton*, 1900; R. A. Austen-Leigh, *Guide to the Buildings of Eton College*, 1921.

Étretat, favourite seaside resort in the dept. of Seine-Inférieure, France. The church of Notre Dame is interesting for its fine Norman work, and there are Rom. remains. Pop. 1700.

Etruria, name of the country of the Etruscans. Etruria Propria, through which the Arno flowed, lay W. of the Apennines and the Tiber; Etruria Campaniana lay S. of the Tiber; and Etruria Circumpadana embraced the valley of the Po. The famous confederation of twelve cities in Etruria Propria included Veii, Tarquinii, Clusium, Cere, Cortona, Volterra, Vulci, Volsinii, and Perusium; in the N. prov. were Felsina (Bologna), Mantua, Ravenna, and Adria, which gave its name to the Adriatic; and in the S. was Capua.

Varro dates the Etruscan era back to 1041 B.C., so that the Etruscans are of far greater antiquity than the Romans. They called themselves Rasena, whilst their Gk. name was Tyrrheni. Most Gk. historians agree in regarding them as emigrants from Lydia—a belief supported by the structural similarity of the tombs found in Tarquinii and elsewhere in E. and near Sardis in Lydia. Yet Dionysius of Halicarnassus is right in emphasising the difference between the Etruscan and Lydian civilisations, and it seems difficult to believe that at such an early period a whole people should have sailed so many m. across the seas in search of a new home. Since the Etruscan language has not been deciphered the extant inscriptions afford no clue to the problem. See also ALPHABET; ETRUSCAN LANGUAGE AND LITERATURE; EUGUBINE TABLES.

But if the Etruscans did not voyage W. all the way from S. Asia Minor, it is almost certain that they settled in Italy as conquerors—a conjecture which many facts combine to support. Thus even in the days of Herodotus the cities of Cortona and Cere had what was called a 'Pelasgic' stamp, that is to say, they bore traces of a more primitive settlement than the Tuscan, and were still inhabited by aborigines. Moreover, Livy notes that the country folk spoke a different dialect from that of the townsmen, which may well have been if the cultivation of the soil were left to an autochthonous and servile pop. But above all the recognition of the Etruscans as an intrusive and victorious nobility offers a simple explanation of the speedy collapse of their power and the rapid disappearance of both their language and civilisation. As a type the Etruscans were thick-set and small, with black hair and dark complexion. The characteristic Tuscan skull differs from that of any other Italic tribe, and the one people with whom ethnologists have compared them are the Kheta or Hittites of the Bible, who, curiously enough, have left sculptural records in Sardis, the chief tn. of Lydia.

E. was an empire when Itome was still an insignificant city among hundreds in her dominion. Thus the Tarquin kings and the famous Lars Porcena of Clusium were probably Tuscan officials or magistrates sent to Rome in token of her subjection, and the Servian wall, the Capitoline temple, and the Cloaca Maxima still bear testimony to the reality of the Etruscan occupation. It was, moreover, to their conquerors that the Romans owed their colleges of augurs, their triumphs, their gladiatorial shows, their 12 lictors, their purple-bordered toga praetexta, their curule chair, and above all their regard and respect for women. The Etruscans attained their highest glory in the sixth century B.C., when they figure in Gk. hist. as the allies of the Carthaginians, who, in 538, expelled the Gk. colonists from Corsica, and again when they (the Etruscans) were defeated in a famous naval battle against the tyrant Hiero I. of Syracuse (474), and once more when they sent ships to help the Athenians during the siege of Syracuse (414). Indeed they were celebrated in ant. times, like the Phoenicians, as a great sea power. But as early as 423, when the Samnites seized the stronghold of Capua, Etruscan supremacy had begun to decline. The inroads of the Gallic hordes affected E. even more than Rome, and in 396, after a ten years' siege, the veteran Camillus finally captured and destroyed the populous and splendid city of Veii in spite of its cyclopean walls. The S. prov. swore allegiance to Rome in 351, and, after a series of crushing defeats, the fate of the Etruscans was finally sealed by the decisive Rom. victory of Cornelius Dolabella at the Vadimonian Lake (283), when Tarquinii was obliged to put an end to her stubborn resistance. Henceforward, as with Greece after Charonea, E. has no hist. Consult G. Dennis, *Cities and Cemeteries of*

Etruria, 1848. See also ETRUSCAN ARCHITECTURE.

Etruria, dist. of Hanley in the co. bor. of Stoke-on-Trent. In 1769 Josiah Wedgwood and Thomas Bentley opened here their famous E. potteries; there are also large iron works. E. gives its name to certain beds of marls and clays in the N. Midlands, useful for pottery manuf.

Etruscan Architecture and Art. Archaeological evidence suggests that the most primitive buildings of the Etruscans were one-roomed, rectangular structures with thatched roofs and wattled walls. These were replaced by wooden cottages with sloping roofs of planks running longitudinally and also transversely. Their temples which were not in essentials different from



ETRUSCAN ART: AMPHORA

the Gk. except in the ground plan, were usually square whereas the Gk. temple was greater in length than in breadth, with the 'cella' divided into three compartments, the decorations, like acroteria and friezes, being of terra-cotta nailed to wooden walls. Underground sepulchral monuments, like 'la Cucumella' in Volsci, are akin to similar 'tumuli' in Lydia, whilst most Etruscan ornament, such as caps., mouldings, and metopes, was but a crude and almost barbaric transcription of Gk. originals. The Romans would speak of colonnades with the pillars far apart as in the 'Etruscan style,' which shows that the Tuscan architects had reproduced their borrowed models not in stone but wood, which permits of a greater span for the architrave. There are still ample remains of the massive cyclopean walls which surrounded the chief tns., sometimes for 6 or 7 m.

Excavated tombs have yielded rich examples of Etruscan art in sculpture, pottery, goldsmith's work, bronze-ware, and wall-paintings.

Etruscan Language and Writing. Etruscan was the language spoken by the pre-Roman pop. of Etruria (q.v.). It has come down to us in over 9000 inscriptions, which have been discovered in Etruria proper, roughly corresponding with modern Tuscany, as well as in other It. regions, such as Umbria, Campania, Emilia, Sicily, Sardinia, and so forth, or even beyond the borders of Italy, in Styria, at Carthage, and in Egypt, where the most important Etruscan document was found. This remarkable inscription, containing about fifteen hundred words, is written on the linen wrappings of an Egyptian mummy, and belongs to the Græco-Rom. period; it is preserved in the museum of Agram (or Zagreb), Yugoslavia. There are not many other long inscriptions extant. The most important of them are the tile from S. Maria di Capua (now in the Berlin museum), of the fifth century B.C.; about 300 words are preserved; the much more recent Perugia cippus contains about 120 words. The Tablet of Magliano (now in the Archaeological Museum of Florence), an inscription engraved on lead, is assigned to the sixth century B.C. The last datable Etruscan inscriptions belong to the early years of the Christian Era.

Notwithstanding the relatively great number of inscriptions (the great majority consisting of a few words only), the many attempts to decipher the Etruscan language have been unsuccessful. It is certain, however, that it is neither Indo-European in structure or vocabulary, nor does it resemble any other known language, although it might have had some affinity with the anct. group of the Caucasian languages. On the other hand, the simple reading of Etruscan inscriptions does not present great difficulties, because the Etruscan script is fairly well known. Etruscan writing goes, like the Semitic and early Gk. and Lat. alphabets, nearly always from right to left; there are, however, inscriptions written in *boustrophedon*, i.e. in alternate lines from right to left and left to right.

The original Etruscan alphabet (eighth century B.C.) derived from the early Gk., and contained twenty-six letters (twenty-one consonants and five vowels). As time went on, there were reductions and various modifications, and about 400 B.C. the classical Etruscan alphabet took its final form, having twenty letters; that is four vowels (*a, e, i, u*, but no *o*) and sixteen consonants. Etruscan speech knew no distinction between the voiced and breathed sounds *b* and *p*, *d* and *t*, *k* and *g*, therefore, the classical Etruscan alphabet had no *b* or *d*. At a later stage, also *k* and *q* disappeared, and the letter C (Etruscan *gamma*) was employed for *g* and *k*. See also ALPHABET.

Etsch, see ADIGE.

Etterbeek, industrial suburb of Brussels, Belgium. Pop. 50,000.

Ettlingen, tn. 4½ m. S. of Karlsruhe, on the Alb, in the free state of Baden, Germany. The tn., which is on the Mannheim-Basel Railway, is both quaint and attractive. Pop. 10,000.

Ettnmüller, Ernest Moritz Ludwig (1802-1877), Ger. philologist. His great work was his patient research into Middle, High, and Low Ger., and into the anc. Norse literature. From 1829 to 1852 he pub. scholarly eds. of old texts, including *Beowulf* (1840), and he also brought out a *Lexicon Anglo-Saxonicum*, and trans. the old Norse songs from the *Nibelungen saga* (1837).

Ettrick: (1) Riv. which waters part of Selkirkshire, Scotland. It rises in Capel Foll (2223 ft.) in the S.W., and flows almost due N.E. for over 30 m., receiving the waters of the Yarrow only before joining the Tweed, 3½ m. below Selkirk. It passes through a country full of literary associations, for the 'E. Shepherd,' James Hogg, lived in the par. of E.; and Deloraine, which recalls the hero of Scott's *Lay of the Last Minstrel*, lies below Buccleuch. E. Water, upon which E. stands, is part of the riv. (2) Forest, once covered all Selkirkshire and parts of the shires of Edinburgh and Peebles. It was once a favourite hunting ground for kings. Trees have long since given place to green pastures.

Ettrick, Baron, *see* NAPIER, SIR FRANCIS.

Etty, William (1787-1849), Eng. painter, was the son of a miller. After 7 years in a printer's works, he at last (1806) realised his ambition and attended the Royal Academy Schools in London, having for one year the advantage of Sir Thomas Lawrence's tuition. 'Sappho' (1811), which was hung at the Royal Institution, was his first success, but the delicacy of his flesh tints and the graceful tenderness of his women soon procured him a wide recognition. One consequence of his study of the Venetian masters during his It. tour of 1821 was that he became famous as a colourist, and especially for the rich glow of his draperies and for the skill with which he harmonised his backgrounds with his central figures or subjects. His masterpieces, include 'Youth on the Prow and Folly at the Helm,' 1832; 'Cleopatra's Arrival in Cilicia'; and 'The Sirens.' They may be seen in the Manchester, Edinburgh, Glasgow, Liverpool, and London art galleries. *See* lives by A. Gilchrist, 1855, and W. C. Monkhouse, 1874.

Etymologicum Magnum, Byzantine Gk. lexicon. In 1848 Dr. Gaisford pub. his eds. as the result of many years' arduous research.

Etymology (Gk. *ἐτυμολογία*, and *λόγος*), an investigation into the origin and original significance of words. It forms a subsidiary part of the science of comparative philology, but has only been scientifically studied since the nineteenth century. False *Es.* have been often suggested through ignorance and half-knowledge. Folk-*E.* has played an important part in the development of languages. Words that people have known from their childhood are taken for granted, but it is quite different with the new terms they meet. These arrest their interest and, believing that every word has its signification, they seek for this, guided by resemblances of

sounds with words already known, thus reaching false conclusions through false analogies. Various examples of the same illogical process are found in the O.T., in the Homeric tales, in quaint *Es.* of medieval writers, and even in some of the present-day dictionaries. Scientific *E.* was made possible by the birth of philology and study of the languages of the *E.* It no longer sought the relation between the words of a single language, exclusively within itself, but extended its view to a whole group of cognate tongues, or, wider still, to a whole family. Thus a new science arose under the title of Comparative Grammar. The evidence that the group of languages known as the Aryan languages forms a family, i.e. are all sister-dialects of one common tongue, consists in their grammatical forms being the same, and in their having a great many words in common. In judging whether an individual word in one of these tongues is really the same as a word in another of these tongues, one is no longer guided by similarity of sound. Words are constantly undergoing changes, and each language follows its own fashion in making these changes. Corresponding words, therefore, in the sev. languages, must have, in the long course of ages, come to differ greatly; and these differences follow certain laws which it is possible to ascertain. Of the laws of interchange of sound, Grimm's Law, named after the great Ger. philologist, is the most important. It exhibits the relations found to exist between the consonant sounds in the three groups of the Aryan languages. Followers of this theory were Curtius and Fick. The Teutonic revival in the nineteenth century in England commenced a hist. of Eng. upon an historical method from which has grown a really scientific Eng. *E.*, as seen in the dictionaries of Prof. Skeat and Dr. Murray.

Etzel (or *Attila*), king of the Huns, *see* ATTILA.

Eu (the Rom. *Augusta*), tn. on the l. b. of the Bresle, 64 m. N.N.E. of Rouen, in the dept. of Seine-inférieure, N.W. France. It is noted for the fine Gothic church of St. Laurent (twelfth century), and for its château (begun in 1578) of the Prince of Orleans, destroyed by a fire in 1902. Pop. 5700.

Eua, or *Eoa*, one of the Tonga Is., S.E. of Tongatabu, in the Pacific. It was discovered by Tasman in 1643.

Eubœa, also called *Egripos* and *Negroponte* (It.), largest is. of the Grecian archipelago, having a length of some 90 m., and a breadth varying from 4 to 30 m. It lies in a direction N.W. to S.E., is separated from the mainland by the narrow strait Euripus, and protects the coasts of Attica, Boeotia, and S. Thessaly. In Homer the inhab. are called *Abantes*. In the N. of E. dwelt the *Histiæi*; below these were the *Ellipoli*, and in the S. were the *Dryopes*. The centre of the is. was inhab. chiefly by Ionians. The promontory of *Artemisium*, where the Gks. gained a great victory at sea over the Persians (480 B.C.) forms a N.E. extrem-

ity. Part of the same mt. range which guards the E. of Thessaly, traverses the is. from end to end, Mt. Dirphys, now Delphi (5725 ft.), in the centre being the highest peak. Chalcis and Erotria, the chief tns., were both Ionic settlements from Attica, which in their turn founded Cumæ and Rhégium, etc., in Magna Græcia. Erotria was destroyed and its inhab. carried off to Persia during the great invasion of 490 B.C. In 506 B.C. the Athenians estab. a hated cleruchy in Chalcis because that city had joined the Spartan league. After an ineffectual revolt, Pericles reduced the is. to submission to Athens in 446. After some years of independence E. fell successively under Macedonian, Rom., and, during the Middle Ages, Venetian rule. From 1470 onwards it was subject to Turkish domination, but in 1830 it was incorporated with independent Greece. All the conquerors have found E. useful for its corn and cattle, and also for certain mineral ores such as iron pyrites. Pop. (is.) 180,000, dept. (including N. Sporades) 200,000.

Eubulus (*fl.* 350 B.C.), Athenian politician, was an orator and a man of some force, but it is impossible accurately to gauge his merits, as the pages of Demosthenes, his arch-enemy, are the most reliable source of our information concerning him. E. was largely influential in securing the acquittal of Æschines, and further advocated peace at any price, a policy hateful to Demosthenes.

Eucaine, synthetic drug, comparable to cocaine in many of its actions, which is used as a local anæsthetic in place of the latter, since it is less poisonous. Two Es., the α and the β , are prepared, the latter being preferable; they are both derivatives of oxymethylpiperidine, and are prepared originally from acetone. E. is most frequently used in operations on the eye and nose, where it is applied to the surface in solution.

Eucalyptus, a genus of Myrtaceæ, contains over two hundred lofty trees occurring in Australia—where they are a characteristic part of the flora—and the Malayan Archipelago and India; while certain varieties are cultivated elsewhere, e.g. Algeria and Italy, for commercial purposes. Many reach a height of 150 ft. and a girth of 30 ft. or even more, and they frequently become hollow; *E. amygdalina* attains a height of 300 ft. The species are of great economic value, yielding oils, kinos, and useful timber, while the well-known oil of E. is obtained from *E. globulus*, the blue-gum tree. The hydrocarbon 'mellitose', a saccharine compound, is derived from the sap of various species of Tasmanian E. Gum and gum resin are yielded by *E. paniculata*, *E. huoniana*, and other species.

Eucharist. The Christian offering of praise and thanksgiving is known by many titles, though that which we are now considering seems to have been the most used in early times. In the Book of Common Prayer, the terms used are the 'Lord's Supper' and the 'Holy Communion': among Rom. Catholics and

some Anglicans, the term 'Mass' is generally used, while members of the E. Orthodox Churches would speak of the 'Liturgy' or the 'Holy Sacrifice.' From the beginning of the Christian church, the Holy E. has been regarded as the greatest of all the sacraments, and round it has gathered the richest ceremonial of the church. But as we trace through the ages the hist. of Eucharistic doctrine, we are faced with the sad fact that the sacrament of unity has been turned by men, generally over-anxious to dogmatise, into a source of controversy and discord. There are, in the N.T., 2 distinct narratives of the institution of the E., each appearing in 2 forms. The first is that of Mark (xiv. 22 ff.) and Matt. (xxvi. 26 ff.), the second is that of Luke (xxii. 17 ff.) and Paul (1 Cor. xi. 23 ff.). A reference to the institution occurs in the fourth gospel, and this reference dates the Last Supper on the day before the Passover, whereas the Synoptic narratives state that it took place on the 'first day of unleavened bread, when they killed the passover.' No solution of this discrepancy is known. The word *Eucharist* is connected with 2 parts of speech in Gk., a noun and a verb. The verb *eucharistein* means 'to feel thankful' and 'to give thanks.' It is the very word used of the thanksgiving of our Lord at the Last Supper. St. Matthew says λαβὼν ποτηριον εὐχαριστήσας ἔειπεν (xxvi. 27), and St. Paul εὐχαριστήσας ἔκρασεν (1 Cor. xi. 24). As Justin Martyr tells us, the disciples of the second century continued to give thanks over the bread and the cup, and hence the term *eucharistein* came to mean to consecrate, and the term *eucharistia* was employed to denote the consecrated elements themselves. Thus St. Irenæus says that after the consecration the bread is no longer common bread but *eucharistia*, consisting of 2 parts, an earthly and a heavenly. At a very early date the liturgical nature of the E. developed considerably, and it has even been held that St. Paul's account of the institution was taken from a previously existing order of service. From N.T. times onward, however, we do find liturgies in an advanced stage of development. The extent of the earliest fixed order can be seen by a comparison of the distinct groups of liturgies. It is impossible here even to touch on the development of liturgiology, but these groups may be mentioned: the Rom., the Gallican, the Alexandrine, and the Antiochene, containing the liturgies of St. Basil and St. Chrysostom. There is no doubt that the E. was at first celebrated in the evening after supper in imitation of Christ's own procedure. But it is equally certain that the change from evening to morning was universally made at a very early date. It is sometimes held that this change was made by St. Paul in the Corinthian Church. St. Augustine (*ad. Januar.*) makes no reference to the occasion of the alteration, but says, 'It has seemed good to the Holy Spirit that, for the honour of so great a sacrament, the Lord's Body and Blood should enter the Christian's mouth before other food.

It is for this reason that the custom is observed throughout the world.' Fasting communion made a morning celebration the ordinary procedure, though it is probable that on fast days, when the faithful were fasting till 3 p.m., it would take place later. In all the earliest references to the Holy E., it is considered that those who are present at the Consecration will all communicate. All those who had been present at the early part of the service but were unable to communicate had already departed at a given signal before the central act of the service began. Those who had departed would include the insane, the catechumens, and certain classes of penitents. The faithful all remained and all communicated with the priest.

The first falling away from this standard is shown in the second canon of the Council of Antioch (A.D. 344) when it is ordered that those who attended the service as far as the lections, but refused to communicate, should be cast out of the church until they repent and confess. The separation being effected by the exorcist. Until the twelfth century, it is admitted by all writers that the laity received the sacrament under both kinds in all solemn public administrations, though the species of bread alone was used under special circumstances. In certain parts, the custom of receiving the species of wine through a tube sprang up on account of the great fear which was felt lest any of the sacred element should be split. The greatest care was taken that no portion of the consecrated bread should fall to the ground. In the E. the custom of receiving the Blood of Christ by the method known as *intinction* early began. Here the particles of the consecrated bread were placed in the chalice, the two elements being given together into the communicant's mouth by a spoon. This practice was condemned in the W. as schismatical and against apostolic tradition. It is generally agreed that the early Christians received the sacrament standing, this being the usual posture for all prayer on the Lord's Day and during Eastertide. It was necessary that all communicants should be baptised persons and that they should not be undergoing ecclesiastical censure. It is noteworthy that the importance of private confession to a priest is insisted on in sev. places before the end of the eighth century. An Eng. example occurs in the *Penitential* of Archbishop Theodore (c. A.D. 700), where a profession is made for dispensation from the rule if necessary. After special cases of excommunication and penance, reconciliation by the bishop or his deputy was, of course, necessary.

As for the days on which the E. was celebrated, our starting point is the celebrated passage in the Acts (ii. 46) which is sometimes held to imply daily celebration. Particular mention, however, is later made only of the Lord's Day (ix. 7), and later allusions in the early writers make it comparatively clear that the Lord's Day was long regarded as the special day for 'the breaking of bread,' even as it now is.

The days next fixed for communion were the 'Station Days,' i.e. Wednesdays and Fridays. Daily celebrations were, however, in use by the time of Chrysostom. We may infer from a canon of the Council of Eliberis (c. A.D. 300) that at that time weekly communion was the regular rule of the church universal, and such it continued to be in the E. until the end of the seventh century. Bede, when writing to Egbert, says that even the more devout amongst the Eng. laity do not communicate except at Easter, Christmas, and Epiphany, but advises insistence on daily communion, which he speaks of as the custom among many of the continental churches. At the present time the Church of England insists on communion 'three times a year of which Easter shall be one.' The Rom. Catholic Church, while encouraging frequent communion requires under pain of sin only once a year 'at Easter or thereabouts.' See B. Frischkopf, *Die neuesten Erörterungen über die Abendmahlsfrage*, 1921; M. de la Taille, *Mysterium Fidei*, 1922; Y. Brilhoit, *Eucharistic Faith and Practice*, 1930; W. Simpson, *Eucharist, Sacramental Principles*, 1932; A. O'Neill, *Mystery of the Eucharist*, 1933.

Euchlorine, explosive, yellowish-green coloured gas, first prepared by Davy by heating hydrochloric acid with chlorate of potash. It has an extremely irritating odour, and is a powerful oxidising agent. It consists of a mixture of chlorine and chlorine peroxide, ClO₂.

Euchre, game of cards, popular in America, but not played until the end of the nineteenth century. Thirty-two cards are used, all cards below seven being rejected. The cards rank as at whist with the exception of the 'Bowers.' The knave of trump suit (right bower) is the best trump; the knave of the same colour (left bower) is the next best, that card belonging to the trump suit. Each player receives five cards from the dealer by two or three at a time, the top card turned up being trumps. When two play, the non-dealer either 'orders up' the trumps or passes. If he passes then the dealer either takes up the trump or passes. If both pass, the non-dealer may call other trumps or may pass again when the dealer makes. If both pass again the hand is thrown in and the cards are dealt again. If the hand is played the non-dealer leads and the dealer plays and must follow suit if possible. The game then continues as at whist, a player 'ordering up,' or taking up, or making the trump wins five tricks (a march) and scores two points; if three tricks (the point) he scores one. If he fails to make three tricks he is enchured, and his opponent scores two. Game is five up. Four-handed K. is generally played. Then the players cut for partners. If the first hand passes, the second may assist, when his partner the dealer takes up the trump and the hand is played. If a player has a very good hand he may play alone against the other three. But he can only play alone when his partner 'orders up,' or when his partner assists, or when he

takes up the trump, or when he orders the trump. The scores are reckoned as before, except that a player playing alone scores four points if he wins five tricks.

It may be noted that E., under very different rules, is a very popular game in the sordid messes of the Brit. Army. In this form of E., the number of cards in the pack varies according to the number of players. For four players, the cards are the joker, red deuce, black deuce (the Bonnies), and Ace to Ten of each suit; for five players, add to the foregoing, the nines of each suit; for six players, add the eights of each suit and two black sevens, and so on. The cards change value according to the suit which is trumps. With a red suit: joker, red benny, black benny, the two red knaves, (Howers) and the other cards in whist order. With a black suit the black benny and the red benny change places, the black knaves take the place of the red knaves, which drop into their usual place as in whist. The knave of the suit called as trumps takes precedence over the other knave. Each player receives five cards, dealt two or three at a time; the top card of the remainder is turned up and becomes trumps. Each player in turn has the choice of calling, the dealer being last. If the suit turned up is called, then the dealer picks the faced card up and discards. If the nominated suit is not called, then the dealer turns it down and the call again goes round in any suit except the turn-down. Five card E. is the form usually played, in which there are partners. The caller calls two suits: the first, trumps; the player holding the highest card of the second suit is his partner (Butty), but does not declare himself. If the caller and his partner take five tricks (a march), two points are scored; if three tricks, one point; if they fail to take three tricks they are cunbred, and all their opponents score two each. When a player is 'low man' (has scored fewest points), he may 'call on his own' (without a partner). A march in this case scores one point for every player, and for three tricks, half this number (three points for five players, etc.). The first player to reach seven points drops out of the game and the others follow at the same figure. When only three or two players remain, there are no partners.

Euchroite, basic arsenate of copper occurring as a distinct mineral. It is related to clinoclase, cornwallite, and tyrolite, all of which are generally isomorphous with the corresponding phosphates of copper.

Eucken, Rudolf (1846-1926), doctor of philosophy, b. at Aurich, educated at Göttingen. His works deal chiefly with the hist. of philosophy. In 1903 he was elected D.D. of the Univ. of Göttingen and in 1910 of the Univ. of Glasgow. In 1908 he won the Nobel prize for literature. He wrote many works, amongst which may be mentioned the following: *Geschichte und Kritik der Grundbegriffe der Gegenwart* (1878), *Die Einheit des Geisteslebens in Bewusstsein und Tat der Menschheit* (1888), *Der Sinn und Wert des Lebens*

(1908), and *Können wir noch Christen sein?* (1911); *Mensch und Welt* (1918), and *Lebenserinnerungen* (1921). His most valuable work, however, was his earliest: *A History of Philosophical Terminology*. See W. R. Boyce Gibson, *Eucken's Philosophy of Life*, 1906. and *God with Us*, 1909; R. Siebert, *Eucken's Welt- und Lebensanschauung*, 1904-1911; W. Tudor Jones, *The Philosophy of Eucken*, 1909; H. Schack, *Denker und Deuter*, 1938.

Eucrase ('easily fracture'), very rare mineral bearing some relation to beryl, and found in Brazil and the S. Urala.

Euclid (fl. c. 300 B.C.), Gk. mathematician, lived, according to Proclus (A.D. 412-485), in the days of Ptolemy I. of Egypt, was older than Archimedes (b. 287 B.C.) and Eratosthenes (b. 276 B.C.), and younger than Plato. His life is practically a blank, but many of his treatises, including the famous *Elements* (*Στοιχεία*), have come down to us. This work, which includes five books on plane geometry, one on proportion, three on the properties of numbers, one on incommensurable magnitudes, and finally three on solid geometry, was for centuries the textbook on geometry in all schools, and has only in comparatively recent years been superseded on the Continent and in the United States. His *Data* (*Δεδομένα*) contains ninety-five theorems, in which it is shown that, given certain hypotheses, other things are deducible. The *Phaenomena* deals with the appearances produced by celestial motions. The musical treatises, entitled *Introduction to Harmony*, and *Section of the Scale*, and the *Optics* and *Katoptrics*, etc., are of doubtful authenticity. See also GEOMETRY.

Euclid, or **Eucleides** of Megara (c. 450-371 B.C.), one of the most zealous disciples of Socrates, and also the founder of that school of philosophy variously called the Megarian, dialectic, or eristic. His philosophy prepared the way for the sceptics, for he delighted in proving contradictory propositions and so encouraged doubt. His writings have all perished.

Eucratides, king of Bactria, lived in the second century B.C. Demetrius, son of Euthydemus, having disputed with E. the succession to the throne and besieged him for five months, was at length completely defeated by E., who thereafter had several victorious campaigns in Asia over the Ind. But, unwisely attacking Mithridates, king of the Parthians, he was defeated and perished at the hand of his own son, who was associated with him in the gov. of Bactria.

Eudæmonism (from Gk. εὐδαιμονία, which describes the condition of a man under the care of a kindly spirit or genius), a much abused term in philosophy in the sense that every writer has contorted or enlarged its meaning to express his own ideas. As a system of philosophy E. upholds happiness as the chief goal of man, the confusion arising from the diverse conceptions of what is essential to that state. According to Aristotle the truly eudæmones are those who enjoy a contemplative existence without material anxieties, and without an impeding to

the full and complete realisation of their highest self. Plato conceived a magnificent social 'eudemonia,' to which every member of the state contributed, and in which everyone shared. For the Epicureans E. was equivalent to hedonism (see ETHICS).

Eudemus of Rhodes (fl. 330 B.C.) associated with Theophrastus as an earnest follower of Aristotle. His *Eudemian Ethics* (seven books) are still extant.

Eudialyte, or **Eudyalite** (Gk., easily dissolved), a vitreous bisilicate of calcium, sodium, iron, zirconium, and other elements found in Greenland in the form of pink rhombohedral crystals.

Eudiometer (from Gk. *eu*, well, and *dos*, the root of Zeus), was primarily an apparatus to determine the purity of air, that is the amount of oxygen in it, but it is now generally used for the analysis of gases and especially of gaseous mixtures. A E. consists essentially of a graduated glass tubular vessel fitted at the top with platinum electrodes for the introduction of the electric spark. As a measure it depends on the observation of the amount of shrinkage after one or more chemical reactions in the vol. or vols. of the gas or gases under consideration. In the case of air the reaction is set up by the explosion caused by the introduction of an electric spark. A known vol. of the atmosphere is confined with about half its vol. of hydrogen. After an electric current has been passed through the mixture, all the oxygen of the air unites with some of the hydrogen to form aqueous vapour, which soon condenses. The shrinkage therefore measures 3 times the vol. of the oxygen, this gas combining with twice its own vol. of hydrogen to form water.

Eudocia, (1) or **Athenais** (c. 401-c. 460), wife of Theodosius II., Byzantine emperor, was the daughter of an Athenian sophist. When her brothers denied her a share in her father's inheritance, she sought and won the protection of Pulcheria, sister to the Emperor Theodosius, whom she (E.) eventually married (421). She repaired to Jerusalem, and became implicated in the Monophysite controversy (453), but St. Euthymius finally reconciled her to the 'true faith.' Among her works were a paraphrase of the Book of Daniel and a poem on her husband's Persian conquests. E. is sometimes wrongly referred to as Eudoxia. (2) (d. 462), the younger, the daughter of the above and of Theodosius II. When her first husband, Valentinianus III., was murdered by Petronius Maximus, she fell an unwilling victim to the usurper and, in revenge, invited Genseric, king of the Vandals, to Italy. The barbarian sacked Rome, and took E. to Africa. (3) (c. 1021-96), widow of the Byzantine emperor, Constantine X.

Eudoxus, (1) Gk. navigator, was dispatched in 125 B.C. by Ptolemy Euergetes, king of Egypt, to explore India and the Arabian Sea. His adventures are recounted by Strabo, who included E.'s discoveries in his great geographical work.

(2) of **Cnidus** (c. 407-c. 355 B.C.), Gk.

astronomer, studied under Plato for some time, spent many years in Egypt, learning from the priests, and later opened a school in Athens which rivalled that of Plato. According to Ptolemy and Strabo he first fixed the length of the year as 365½ days, whilst Vitruvius ascribes to him the invention of the sun-dial. He was also a mathematician and philosopher, and won golden opinions from Cicero.

Euganean Hills, in N. Italy. They are a low volcanic range forming a small group extending for about 10 m. from the neighbourhood of Padua to Este. They are covered with woods, and contain many hot springs. The culminating point is Mt. Venda, 1890 ft. high.

Eugene, city of Oregon on the Willamette R. The chief industries are iron works, machine shops, flour mills, manufs. of wagons, furniture, and woollens. It is the seat of the Univ. of Oregon. Pop. 28,800.

Eugène, François, Prince of Savoy (1663-1736), renowned Fr. gen.; was b. at Paris. He was youngest son of the count of Soissons, grandson of the duke of Savoy and related, on his mother's side, to Cardinal Mazarin. Originally intended for the church, but his tastes were more for military renown. After his father's death, and on the refusal of Louis XIV. to give him a commission, he left France and served under Emperor Leopold as a volunteer against the Turks. He displayed great courage and tactical talent and rapidly rose. In the Coalition war in Italy against France, he covered himself with glory, became a field-marshal in 1693, and put an end to Turkish power in Hungary by winning the famous battle of Zenta in 1697. He commanded the It. army in the War of Succession in 1701, but effected little of importance, owing to the smallness of his forces. In 1703 he became president of the council of war, took over command of the Ger. army, and assisted Marlborough to win the battle of Blenheim, 1704. After being chocked by the Fr. gen., Vendôme, and twice wounded, he defeated the Fr. and drove them out of Italy. He shared with Marlborough, the victories of Oudenarde and Malplaquet. After the retirement of England and Holland from the struggle, Prince E. was unable to withstand the enemy on the Rhine, and was defeated by Villars in 1712. In 1716 war with the Turks recommenced, and the prince was everywhere successful. He defeated an army twice the size of his own at Peterwerdein, took Temesvar, and after a desperate battle took Belgrade by assault. After the Peace of Passarowitz, he laboured with unwearied energy in the cabinet. He died at Vienna. See *Illos* by G. B. Malleson, 1883; and H. von Sybel, 1937.

Eugenia, genus of Myrtaceae, contains numerous species, all of which grow in the tropics, and many bear edible fruits. The best-known plant in the genus is *E. carvophyllata*, which produces the cloves of commerce; they are the dried flower-buds of the tree. *E. Malaccensis* is known as the Malay apple, or rose apple.

Eugenic Acid, see EUGENOL.

Eugenics is that science which has for its aims the perpetuation of those inherent and hereditary qualities which aid in the development of the human race. (See *BIOLOGY—Practical Value of Biology*.) Sir F. Galton—who first coined the word eugenics in his work on *Human Faculty* (1869)—by his valuable research work and his many publs., added considerably to the importance and value of the science. Not only this, but in his will he left sufficient money to found the Galton Chair of Eugenics at the London Univ. Attached to the chair is a valuable library and laboratory. The Galton Laboratory for National Eugenics publishes the *Annals of E.*, the *E. Laboratory Memoirs*, the *E. Lab. Lecture Series*, and the important *Treasury of Human Inheritance*, an extensive collection of family pedigrees, illustrating the inheritance of physical, mental, and pathological characters in man. Besides the works of Galton, there is an extensive literature on E.: See F. Galton, *Probably the Foundation of Eugenics*, 1907; K. Pearson, *Grammar of Science*, 1911; L. Doncaster, *Heredity*, 1921; S. J. Holmes, *Studies in Evolution and E.*, 1923; L. Darwin, *Need for E. Reform*, 1926; J. A. Thomson's *Heredity*, 1926; F. Schiller, *Social Decay and Eugenic Reform*, 1932; C. Neurath, *Modern Man in the Making*, 1939; also G. K. Chesterton's counterblast, *E. and Other Frits*, 1922. The Eugenics Society was formed in London in 1911, to promote the study of national eugenics and publishes a quarterly review. See also HEREDITY; MENDEL AND MENDELISM.

Eugénie, Marie Ignace Augustine de Montijo (1826–1920), daughter of the count of Montijo, empress of the Fr., was b. May 5, at Granada, Spain. In 1853, at Notre Dame, Paris, she was married to Napoleon III., and three years later she became the mother of the Prince Imperial. In 1870, on the fall of the empire, came to England and took up her residence at Chislehurst, afterwards removing to Farnborough. Three years after her coming to England, Napoleon died, and she lost her son in the Zulu War of 1879. While on a visit to her nephew, the duke of Alva, she died in Madrid, July 11. See E. Legge, *The Empress Eugénie*, 1910.

Eugenin (C₁₁H₁₀O), substance which is obtained from oil of cloves.

Eugenius, name of four popes: Eugenius (St.) I., pope from 654–8, festival, Aug. 27; Eugenius II., pope from 824–27; Eugenius III., pope from 1145–53; and Eugenius IV., pope from 1431–47. The latter's pontificate was marked by a schism created by proceedings in the council of Basle towards the reform of the church and the limitation of papal authority. He excommunicated the council and the council deposed him, but he succeeded in re-uniting the Church round his own person and office. Holding a council at Florence, he concluded a re-union with the Gk. Church (1439), and later with Armenians (1439), Jacobites (1443), and Nestorians (1445).

Eugenol, or **Eugenio acid**, an aromatic oil, obtained by combining oil of cloves or

oil of pimento with alcoholic potash. Used as a remedy for toothache.

Eugubine (or **Iguvine**) **Tables**. These tablets, numbering seven, were found in the fifteenth century at Iguvium, the modern Gubbio (Umbria, Italy). They contain large texts, which are engraved on both faces of the tablets, and have been deciphered as parts of the liturgy of a sacred brotherhood of Iguvium. Tables I–IV and part of the Vth are written in Umbrian script, which is not only an offshoot of the Etruscan (q.v.) alphabet, but is so close to its classical form, that eminent Etruscologists, such as the late It. Prof. Giulio Buonamici, consider it as Etruscan. These tablets are attributed by some scholars to the fourth or even to the fifth century B.C., by others to the second or third century B.C. The rest of Table V and Tables VI and VII, are written in Rom. characters and are assigned to the first century B.C.

Euhemerus and **Euhemerism**, the latter is the name applied to the historical theory of the origin of mythology, from its founder Euhemerus, a native of Messene about the fourth century B.C. While voyaging to the Indian Ocean he professed to have discovered a new is. called Panchala. Here he is supposed to have found a number of inscriptions representing the prin. gods of Greece as mere earthborn beings, deified after death for their superior strength and abilities. His work *Hiera Anagraphe* was lost, but for it he was accused of Atheism and his name became a byword for mendacity. Many eminent men, among them Polybius, Lactantius, and St. Augustine, adopted its theory. Later Gk. writers simplified the theory, eliminating extravagant things and leaving a list of commonplace and credible stories. Thus *Æolus* became an anct. mariner; the *Cyclopes* a race of savages inhabiting Sicily; *Atlas*, an astronomer; and *Scylla* and *Pegasus*, fast-sailing pirates. The system still exists in some current handbooks of mythology. Euhemerism was the favourite theory of the so-called philosophical historians of the eighteenth century in France. It was extended to England by a trans. of Abbé Bauer's great work, *The Mythology and Fables of Antiquity Explained from History*. Vossius, Bochart, and Huot belong to this school; Mr. Gladstone was the latest and ablest exponent of sacred Euhemerism. Herbert Spencer also embraced the theory in his explanation of the origin of religion.

Euhemerus, see also ANCESTOR WORSHIP. **Eulenspiegel** (Ger. 'owl-glass'), the prototype of all knavish fools of later times, b. at the end of the thirteenth century, near Schöppenstein, in Brunswick. He was 3 times baptised, once in the font, secondly in the mud, and the third time in hot water. He wandered over Europe, experienced many wonderful and comical adventures, and perpetrated many knavish tricks. His place of burial is not certain, as two places claim to have his bones in their respective churchyards. One stone stands to his memory at Mölln, near Lübeck, where he

is supposed to have died in 1350. His bones are also at Damme in Belgium, where his death is placed about 1307. In modern times his story is embodied in one of the masterpieces of Belgian literature—*Till Eulenspiegel en Lamme Goedzak* by C. de Coster. The first ed. appeared in 1868. It is really a kind of epic which celebrates the struggles of the people to secure freedom from Sp. tyranny. Gerhard Hauptmann, the great Ger. poet and dramatist, pub. a vast poem called *Eulenspiegel*, in parts so mystic that it puzzled his critics.

Euler, Leonhard (1707–83), Swiss mathematician, b. at Basle, and studied under John Bernoulli. He went to St. Petersburg, where he became Prof. of Physics, and in 1733 of mathematics in the Academy. In 1741 he was invited to Berlin by Frederick the Great, and he pub. many valuable papers during this period. His later years were spent in St. Petersburg in total blindness, but his servant wrote at his master's dictation. The *Introduction to Algebra* (trans. 1840) was completed in this way. His chief works are: *Theory of Planetary Motion* (1765), *Institution of Differential and Integral Calculus* (1755), *Introduction to Analysis of Infinities* (1748). See lives by F. Rudol., 1884; S. Schulz-Euler, 1907; A. Speiser, 1934. See also EULERIAN NUMBERS; HYDROKINETICS. — *Euler's Equations of Motion*.



LEONHARD EULER

Engraving after a painting by L. Lorgne

Eulerian Numbers. Named after Euler (1707–1783), the Swiss mathematician. The expansion of $\cos x$ is $\cos x =$

$$1 - \frac{x^2}{2!} + \frac{x^4}{4!} - \dots, \text{ and the expansion}$$

$$\text{of } \sec x = \frac{1}{\cos x} \text{ may be written}$$

$$1 + \frac{A_1 x^2}{2!} + \frac{A_2 x^4}{4!} + \frac{A_3 x^6}{6!} + \dots \text{ where } A_1,$$

$A_2, A_3, \text{ etc.},$ are known as E. Ns., the first nine of which were first computed by Euler. The first five are 1, 5, 61, 1385, 50521, and the 50th contains 127 figures. Some of the properties of these numbers may be noted here, viz., every E. N. is a positive odd integer; the sum of any two successive E. Ns. is divisible by 3. The chief usefulness of E. Ns. is in the summation of certain series.

Eumæus, faithful swineherd in the *Odyssey*, who recognises Ulysses on his return from Troy, and aids him in destroying the suitors of Penelope (q.v.).

Eumenes (c. 360–316 B.C.) Macedonian gen., and a native of Cardia in the Thracian Chersonesus. At a very early age he was employed as private secretary by Philip II. of Macedon, and, on the death of that prince, by Alexander. When Alexander died, Cappadocia and Paphlagonia were assigned to E. He was put to death by Antigonus.

Eumenes I., king of Pergamum. He succeeded his uncle, Philetarus, in 263 B.C. The only event of importance in his reign was his victory near Sardis over Antiochus Soter, which enabled him to secure possession of the districts round his cap.

Eumenides (the 'well-wisher'), euphemistical name for the Erinyes, the Rom. Furies, or Diræ, 3 fearful maidens who dwell in the depths of Tartarus. Their function is to punish men for crimes such as perjury, murder, inhospitality, and violation of filial duty. Their names are Allecto, Megera, and Tisiphone. In the poets they sometimes appear as one, and one finds, in the tragedies of Æschylus, a whole chorus of Erinyes. Later, they were considered as goddesses, and sacrifices of sheep and libations of nephalia (honey and water) were offered to them. Later poets and sculptors represented them as winged virgins, dressed in the garbs of huntresses, with serpents encircling their heads. Milton confuses them in some of his works with the three Fates, Clotho, Lachesis, and Atropos. See J. G. Lawson, *Modern Greek Folklore and Ancient Greek Religion*, 1910.

Eumenius: (1) Trojan killed by Camilla in Italy (see Virgil, *Æneid*, II.). (2) Gallic rhetorician, b. at Autun about A.D. 280. He was grandson of Glaucus, the Athenian rhetorician who had settled in Gaul. E. practised rhetoric successfully both at Autun and at Rome, and was appointed to the court of Constantius Chlorus, and put at the head of a new college in Autun. Of the panegyrics attributed to him, one was made before the Emperor on the occasion of the retaking of Britain; another on the foundation of colleges, and a panegyric on Constantia Augusta, spoken at Treves and full of hyperbole. These speeches have frequently been reprinted, especially in the collection known as the *Duodecim panegyrici veteres*.

Eumolpus ('sweet singer'), in Gk. mythology the son of Poseidon and Chione, a legendary priest, poet, and warrior. The Eleusinian mysteries were generally considered to have been founded by E. As priest E. purified Heracles from the murder of the centaurs; as

musician he instructed him in the playing of the lyre. He is said to have been the first priest of Dionysus, and to have introduced the cultivation of the vine and fruit trees.

Eunapius (b. c. A.D. 347), Gk. anti-Christian historian and a native of Sardis. He is the author of *Lives of the Philosophers and Poets*, ed. by J. F. Boissonade, 1849; and also of a hist. from c. A.D. 268 to c. A.D. 404.

Eunomius, leader of an extreme sect of Arians who were called after him Eunomians. His confession of faith to Theodosius in 383 was rejected. His theory was that of Arius carried to an extreme. After his death his followers disbanded through internal quarrelling.

Eunuoh (Gk. *ευνουχ*), one who has charge of a bed, etymologically, one who has charge of women's apartments in the E. countries. The term, however, applies particularly to a person who has been castrated in order to serve as attendant in a harem. Sometimes E. occupied high official places in the state, so that the word E. was applied to a high official, the chamberlain. The barbarous custom of castration was probably earliest practised in Africa, but it was also a custom among the Romans. As late as the seventeenth and eighteenth centuries male castrati were employed in church choirs and on the operatic stage to sing soprano and contralto parts.

Eunus (d. 133 B.C.), Syrian slave and leader of a revolt of slaves in Sicily in 135 B.C. While working at Enna he led the slaves of a slave-owner, Damophilus, in a successful attack on the tn., and before the revolt was crushed it had spread all over the Is.

Eunonymus, genus of shrubby and arborescent plants in the family Celastraceae, is indigenous to Europe and Asia. The species are used in the manuf. of spindles. *E. europaeus* growing in hedges is the only Brit. representative; the fruit (capsule) is red when ripe, and splits open to show the 1 seed, each enclosed in an orange-coloured fleshy aril.

Eupatoria (Towpatoria), Russian sea-port and health resort, on the W. coast of the Crimea. It is a peaceful seaside tn. with what is probably the finest beach in Europe. There are a great many Jewish inhabs., and it contains the residence of the spiritual head of the Karaites sect. Trades are carried on in cereals, skins, cowhair, felt, tallow, and salt. Formerly, in 1736, it was Turkish ter. Taken by the Gers. in 1942, it was retaken by the Russians in April 1944. Pop. 16,000.

Eupatorium (Gk. *εὐπατόριον*), a genus of Composite, which takes its name from Mithridates Eupator, king of Pontus, who first recognised its medicinal properties. There is only one Brit. species, *E. cannabinum*, the hemp-cotton, which grows in marshy soil. Formerly it was highly valued as a medicine. It is very abundant in America. *E. perfoliatum*, or cross-wort, is used as a substitute for Peruvian bark.

Eupatrides, literally trans. means 'sons of noble fathers,' the anct. nobility of

Athens, the autochthonous pop., the dwellers in the city, the descendants of royal stock. The E. represent the only nobility that had any political recognition in early times. They were at the height of their power in the period during the limitation of the monarchy.

Eupen, industrial tn. with a hydro-pathic estab., in the prov. of Liège, Belgium, 9 m. S. of Aachen. By the Treaty of Versailles (1919) it was stipulated that the dists. of Eupen and Malmédy should be transferred from Germany to Belgium, if the inhabs. wished it, as a subsequent plebiscite indicated. The ceded dist. has an area of 400 sq. m. and a pop. of 60,000. When Belgium capitulated to the Gers. in May 1940 E. once more fell to Germany. In Oct. 1944 Amer. First Army troops entered Germany in the Aachen area east of E. which tn. was soon afterwards captured. Most of the inhab. speak Ger. Pop. (In.) 14,500.

Euphemism, in speech or writing, the avoidance of an unpleasant or indelicate word or expression by the use of one which is less direct, and which evokes a less disagreeable image in the mind. Thus for 'he died' is substituted 'he fell asleep' or 'he passed away.' Thus, the Gks. substituted 'Eumenides' (q.v.) benign goddesses, as a synonym for the 'furies.'

Euphorbia, see POINSETTIA.

Euphorbia, prin. genus of Euphorbiaceae (q.v.), contains over 700 species, widely distributed in the warmer parts of the globe, and a few in Britain. Both herbs and shrubs are common, while some of the plants occurring in the hotter and drier countries have succulent stems and greatly resemble the cacti. These, however, may be distinguished from cacti by their omitting a milky latex when punctured, and by the fact that the spines, when present, never form clusters. The inflorescence is most curious and forms a *cyathium* resembling a single flower: five bracts surround a number of male flowers, each reduced to a solitary stamen, and in the centre is a single female flower which forms an ovary of three carpels. *E. lathuris*, the caper spurge, is a common weed in cottage gardens, and *E. amygdaloides*, the wood spurge, is also well known in Britain.

Euphorbiaceae, a family of Dicotyledons, contains over 4000 species of trees, shrubs, and herbs, and is distributed over the whole globe. Many contain dangerously poisonous substances, while some are used as purgatives, others have a farinaceous substance used as food, e.g. cassava, and rubber, castor-oil and cascarrilla bark are well-known products. Few of the characteristics are common, but the flowers are always unisexual and regular. There are generally 5 perianth leaves, the stamens may be united or free, one to many in number, and the ovary is superior usually with three united carpels, is trilobular, and there are always one to two ovules in each loculus. Some of the chief genera are *Euphorbia*, *Ricinus* (castor oil), *Croton*, *Manihot*; *Poinsettia* (q.v.), is cultivated in hot houses.

Euphorbium, derived from the *Euphorbia officinarum* growing in N.W. Africa, a violent, irritant, and acrid substance, formerly much used in medicine, especially as a remedy for angina pectoris, as it acts on the nerve-centres for breathing and for the heart. It is dangerous to use *E.* except in minute doses. The term is sometimes inaccurately applied to the various species of gum-resin.

Euphorbus, son of Panthous, one of the bravest of the Trojan heroes slain by Menelaus (*Iliad*, xvii. 1-60). In support of his theory of the transmigration of souls, Pythagoras declared he had once

considerable distance it forms the boundary between Mesopotamia and Syria; thence it flows S.E. to its junction with the Tigris, and the joint riv., now called Shat-el-Arab, empties itself by sev. arms into the Persian Gulf, after a course of about 1700 m. The present place of junction with the Tigris has been shown by Sir W. Willcocks to be at Garnat Ali, 30 m. higher up than Kurna, the former place of confluence. Formerly the Tigris and the *E.* preserved each a separate course to the sea. The distance between the two rivs. varies from 18 to 19 m. The prin. tribs. of the *E.* after it



EUPHRATES

E.N.A.

A ferry near Deir-ez-Zor, Syria

been *E.*, whose shield hung up on the temple of Argos. Pythagoras claimed this shield as his own.

Euphrasia, genus of Scrophulariaceæ, contains about fifty species of plants which are semi-parasites, i.e. they have green leaves and carry out photosynthesis, but their roots are attached to other plants from which water and salts are obtained. *E. officinalis* is the common euphrasy, or eyebright.

Euphrates (Babylon. *Puraltu*; Hebrew *Peralu*; Arabian *Frat*; largest riv. of W. Asia. It rises in Armenia in two branches, the Kara Su and the Murad; the former rises about 20 m. N.E. of Erzerum, in the Tcheldis Mts., the latter 45 m. N.E. from the nearest point of Lake Van. Both these rivs. flow in a S.W. direction till they unite near Kebban in about 39° N. lat. and 39° 25' E. long. The united stream flows S.W. then to Sunaysat, having forced a passage through the main range of the Taurus Mts. and formed a succession of rapids and cataracts. For a

emerges from the mts. are, on the r. b. the Sagar; on the l. b. the Balik Su and the Khabur. The prin. tns. on the banks are now Sunaysat, Bir, Ana, Hit, and Hilla, but the greater part is inhabited only by roving tribes of Bedouins. The riv. is navigable for small craft as far as Bir, a distance of 1200 m., whilst larger vessels can ascend as far as the confluence with the Tigris. The *E.* has played a conspicuous part in the hist. of the world, as the many ruins of great cities on its banks bear witness; besides Babylon, 'the glory of kingdoms,' Ur, Zarsa, Nippur, and Sippara were situated there. The canal system of the riv. was very complete in early times, and contributed not a little to the amazing fertility of the region. Our information on the *E.* has of necessity increased greatly by reason of the Brit. occupation and administration of Iraq for some years after the First World War. Characteristic floods have often occurred during this period; that of 1929 was probably the highest for nearly

forty years, and illustrated the effect that riv. floods have had on the life of Iraq since the dawn of hist. Warning is now given by wireless from Syria of the daily rise and fall of levels at Deir-ez-zor, so that at least all available labour for the defence of the dykes can be secured. The provision of labourers for the dykes is decreed by law to be the duty of the agric. community. Whirlpools, as in 1929, caused severe erosion and undermined the embankments. The damage by floods to crops may be severe, and if the floods are very high, the riv. becomes indistinguishable from the sheets of water spread over the land; while, as in 1929, a small quantity of E. water may travel some 40 kilometres across country and flow into the Tigris. Owing to the fact that the prevailing N.W. wind acts with the current of rivs. in Iraq, sailing craft have to be towed up-stream; the E., like the other rivs., is very shallow in autumn, so that the draught of ships has to be limited to 3½ ft., and this is so even on the Tigris which is deeper than the E. No steamers ply on the E., owing to its shallowness, which is particularly marked in the Hammar Lake; but sailing craft carry local freight; and motor boats can be hired on the Middle E. See A. Musil, *Middle Euphrates*, 1927; M. G. Imdes, *Régime of rivers Euphrates and Tigris*, 1937. See also BAGDAD RAILWAY; and for further details of the Tigris, see TIGRIS.

Euphrosyne, one of the Graces, 'The Joyous One,' see CHARITIES.

Euphuism, the florid mode of speaking and writing towards the end of the reign of Queen Elizabeth. It was brought into fashion by the romance *Euphues*, written in 1578 by John Lyly, who in addressing his writings chiefly to women said he would rather see his works 'he shut in a lady's casket, than open in a scholar's study.' His idea was not to improve, but to amuse. E. did not attempt to render the simplicity of nature, but to be artificial and affected in its desire for refinement. Dr. Laudmann (New Shakes. Soc. Tran. 1880-86) gives the following sound description of E.: (i) An equal number of words in collateral or antithetical sentences, well balanced often to the number of syllables, the corresponding words being pointed out by alliteration, consonance or rhyme; (ii) "Unnatural Natural History," which he (Lyly) learned from Pliny; (iii) An oppressive load of examples taken from ancient history and mythology, as well as apophthegms from ancient writers. Some commentators on Shakespeare have suggested that in *Love's Labour's Lost* the dramatist was satirising the euphuists in the character of Don Adriano de Armado, and Scott in his character of Sir Piercio Shafton in *The Monastery* speaks of the 'Euphuist Don Armado,' as he calls him in the Introduction to that novel. But neither Sir Piercio nor Armado talk the E. of its masters, Lyly, Greene, and Lodge. Doubtless this peculiar affectation was at its height when Shakespeare's play was written to satirise all manner of affectations such as Spanish high-flown diction,

bombast, excessive alliteration and hyperbole; but the very fact that there is but little E. in the play is a strong argument against the validity of Blount's statement, made in 1632, in an address prefixed to an ed. of Lyly's plays, that it was the language of the ladies of Elizabeth's court.

Eupion, highly inflammable liquid of the paraffin series, discovered by K. Reichenbach. It is formed from many substances, such as wood, coal, caoutchouc, bones, resin, and the fixed oils.

Eupoda (Gk. *εὐποδία*, strength of foot), the name given to a section of Coleoptera noted for the thickness of their hind legs. The genus *Sagra* especially is so developed, and is therefore known as the kangaroo beetle.

Eupolis (c. 446-411 B.C.), Athenian poet of the old comedy who flourished in the time of the Peloponnesian war. He is ranked by Horace as one of the greatest writers of his school. In the elegance and purity of his diction he was reputed to be equal to Aristophanes, and in command of irony and sarcasm to rival Cratinus. His plays, of which only fragments survive, included *Kolakes*, *Marikas*, *The Baplae*, *The Demoi*, and *Poleis*. It is not true that he was drowned by Alcibiades, who is said to have thrown him into the sea for having attacked him in one of his plays.

Eurasian, term used to denote children born of a Hindu mother and a European father. For more than half a century it was confined to India, but is now descriptive of any half-caste.

Eure, dept. of N.W. France, formed in 1907 from a portion of the old prov. of Normandy. It has three arrons., Evreux (the chief tn. of the dept.), Les Andelys, and Bernay. The ter. of Eure is broken up by its rivs. into well-wooded plateaus. The climate is mild, but most variable. Chief products, wheat, flax, and beetroot, cattle and horses of pure Norman breed, for which the dist. is famous. Fruit is abundant; the minerals are marl and brick-clay. Pop. 315,900.

Eure-et-Loir, dept. of N. France, situated to the S.E. of the dept. of Eure, is divided into the three arrons. of Chartres (the chief tn. of the dept.), Chateaudun, and Dreux. The E. portion is a gently undulating plain, called the Beauce, the W. called the Perche, is of a more diversified nature, with hills, forests, and numerous rivs. The chief riv. in the N. is the Eure, in the S. are the Loire and the Huisne. None of the rivs. is navigable save the Eure for a short distance. The Perche dist. has a slightly colder and healthier climate than the Beauce, where fever sometimes occurs, caused by the pools of rain water which form the only water supply in summer for many vills. Wheat and oats are the prin. crops, and apples are largely grown. Textile goods and boots are manufactured and there are foundries. Area of prov. 2293 sq. m. Pop. 258,100.

Eureka, city of California, U.S.A., on Humboldt Bay, co. seat of Humboldt co., and the most westerly city in the U.S.A.

Great quantities of redwood lumber are shipped. Pop. 17,000.

Eureka Springs, city of N.E. Arkansas, U.S.A., in the Ozark Mts., a health resort, with radio-active springs. Pop. 2400.

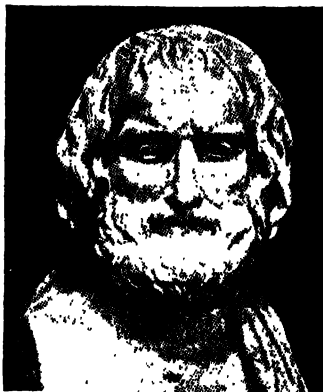
Eureka Stookade, see under BALLARAT; DIGGER'S CONGRESS.

Eurhythmic (Gk. εὐρ, well; ῥυθμός, flow) is a method, developed by M. Jacques-Dalcroze, of teaching music through its realisation and interpretation by movements of the body. By a succession of exercises carefully graded and directed, an intellectual appreciation of rhythm is attained, based on the natural perception of rhythm illustrated by the movements of many people in response to a barrel organ playing a march or dance music. Later exercises develop the imagination and encourage its expression by free descriptive movements. Attention and concentration, in addition to physical control, are exacted by all the exercises, by means of which the sense of hearing and the judgment of direction and intensity of sound are trained. Concentration is essential, for even momentary wandering causes the movements of the body to be out of time with the music. Moreover, without concentration, the high degree of physical control that can be gained would be impossible, for the more difficult exercises demand separate control of each arm, the legs, and head, so that each can move at a different rate from the other and simultaneously express four different rhythms. The eurhythmic method of teaching music incorporates the development of mental and physical control, thereby increasing efficiency. See E. J. Dalcroze, *Rhythm, Music, and Education*, 1921.

Euripides (Εὐριπίδης) (c. 480-406 B.C.), last of the great trio of Gk. tragedians (Æschylus, Sophocles, Euripides). The Parian marble gives the date of his birth as 485 (i.e. 480). He was probably b. in the is. of Salamis (whither his parents had fled, from Athens on the invasion of Xerxes, on the day of the famous battle), according to tradition, of humble parents. (See Aristophanes, *Acharnæ*, 478; *Equit*, 17; *Rana*, 840.) Ancient authorities state that his father, Mnesarchos, was of a respectable family and his mother, Kleito, perhaps of noble family. His wife seems to have been one Mulo, daughter of Mnesilochos, and possibly a relative. The legend of E. as a misogynist, which owes its origin to the fact that he was the first Gk. to portray woman realistically, is probably apocryphal; but the infidelity of two wives in succession is said to explain his tone in reference to the majority of their sex. There seems to be little ground for supposing that he was twice married. His life was spent in study, and he early came under the influence of the Sophistic teaching—whence his appreciation of the conflict between traditional theology and scientific judgment. Fiery and eager, he reaped the reward of his acid tongue, was forced to leave Athens, and lived for some time as a guest at the comparatively barbarous Macedonian court, where he died.

The best study of E.'s character will

be found in U. von Willamowitz-Moellendorf's *Herakles*. In his youth he cultivated gymnastic pursuits, and won the prize at the Eleusinian and Theban contests. He received a good education, and became the friend of Protagoras, Anaxagoras, Socrates, and others. He acquired great oratorical skill under Prodicus, beginning his career as a writer, about 455, winning third place with the *Pleiades*. Not till 441 did he secure the first prize, and only about five times in all. The scientific and philosophic thought expounded in his plays, often approaching religious scepticism, did not find favour with his contemporaries. He represented the new moral and social influences that were affecting Athens, and in the next century his popularity increased ten-fold,



EURIPIDES

and many considered his dramas superior to those of Æschylus and Sophocles. He is noted pre-eminently as a master of pathos and for his delineation of female character. He is interested in the experiences of the ordinary individual, rather than in that of legendary beings, drawing his characters with a fine realistic touch. E. has been called the most modern of the three great Athenian dramatists, and 'the forerunner of Rationalism.' The anc. criticisms of Aristophanes and others are very prejudiced, but Quintilian and Cicero both admired E.

E. was essentially a realist whose art reflected the humours and passions of daily life and the vehicle he sought as his medium was a drama of archaic plots and simple style, not unmingled with sheer incongruities; but, seen through his rationalism, the plays became a formidable weapon of propaganda for the fifth century illumination. For E. plot is almost immaterial, for several of his plays, seen, in point of plot, to be much the same as the compositions of Phrynichos.

He introduced changes in Gk. drama; notably in the prologue which, in his plays, assumes the form of versified programme; and in his employment of the device of the *deus ex machina* or god who comes on at the end to wind up the plot whether artistically or not. Unfortunate in both his first and second marriages he finally left Athens, about 409, and died at the court of Archelaus of Macedonia. A noble cenotaph erected to him at Athens declared that 'all Greece was his monument.'

About eighteen of his plays only are extant, but titles of many more are known. Arranged in approximate chronological order, the extant plays are: *Alkestis*—which appeared in 438 B.C., together with the *Cretan Women*, the *Alkmeon in Prophis* and *Telephos*, the *Medeia*, brought out in 431 B.C. with the *Philoctetes*, *Diktys*, and the satire *Harpageters*; *Hippolytos*, *Crowned*, 428 B.C., *Hekabe*; *Kyklops*—sole surviving specimen of a satyr-play; *Children of Herakles*; *Mad Herakles*; *Andromache*; *Suppliants* (the protection given by Athens to the mothers of the Argives who fell at Thebes); *Trojan Women*; *Iphigenia in Tauris*; *Ion*; *Elektra*—E.'s version of the tale told by Aeschylus in the *Choephoroi*; *Helene*; *Phoenician Women*; *Orestes* (408 B.C.); *Iphigenia in Tauris*, *Bacchantes* (posthumously produced, with the *Alkmeon in Corinth*, in 407 B.C.); and *Ithosos*. In more modern times great homage has been paid to the genius of E.; Milton, Browning, Schiller, and Alfieri were all ardent admirers. Among numerous eds. may be mentioned those of Lascaris (1496, four plays), Musurus (Aldine ed., 1503), A. Kirchhoff (1867), C. Dindorf (5th ed. 1870), A. Nauck (3rd ed. 1871), and Paley (1874-80) have also produced complete eds. There are admirable verse trans. by A. S. Wray (1894-98) and G. Murray (1902-07).

See J. P. Mahaffy, *Introduction to the Study of Euripides*, 1879; J. E. Sandys, *Bacchae*, 1880; J. A. Symonds, *Greek Poets*, 1893; A. W. Verrall, *Euripides the Rationalist*, 1895; A. E. Haigh, *Tragic Drama of the Greeks*, 1896; W. Nestle, *Euripides, der Dichter der griechischen aufklärung*, 1901; G. I. Norwood, *Life of the Bacchae*, 1908; H. Steiger, *Euripides*, 1912; E. Rowald, *Die griechische Tragödie*, 1930; H. Murray, *Athenian Drama*; *Euripides*, 1931; A. Rivier, *Essai sur le tragique d'Euripide*, 1941; R. P. Winnington-Ingram, *Euripides and Dionysus: An Interpretation of the Bacchae*, 1948. For fragments of E. see Weil, *Nouveaux fragments d'Euripide*, 1879; F. Blass, *De Phaethontis Eurypidis Fragmentes*, 1885; A. S. Hunt, *Tragicorum Graecorum Fragmenta Papyracea Nuper Reperta*, 1912; R. J. Walker, *The Macedonian Tetralogy (Alcmena, Lemenus, Teneides, and Archelaus, with trans.)* 1920; A. Nauck, *Fragmenta Tragicorum Graecorum* (ed. by R. J. Walker, 1923).

Euripus, or Euripos, see EUBŌKA.

Euroclydon, a N.E. wind in the Mediterranean now called Gregalia. It is mentioned in Acts, xxvii, as being the

cause of the shipwreck of the vessel in which St. Paul was sailing.

Europa, daughter of Agenor, or of Phoenix, king of Phoenicia, and sister of Cadmus. The Gk. legend was that she was beloved by Zeus, who assumed the form of a white bull and carried her away to Crete, where she became mother of Minos, Ithadamanthus, and Sarpedon. After death she was worshipped at Crete as 'Hellotis.' There is considerable discussion as to the etymology of her name. Cf. the myth of Persephone. See Horace, *Odes*, iii. 27; Ovid, *Metam.* ii. 833; A. Pauly-Wissowa, *Realencyclopädie der klassischen Altertumswissenschaft* (vol. vi.) 1909.

'Europa,' The, quadruple-screw turbine-driven passenger liner of the German mercantile marine (1939). Gross tonnage 49,746; length, 890·2 ft., breadth 102·1 ft.; speed 26 knots. Built 1928. Owned by the Norddeutscher Lloyd, the E. was the crack liner of the Ger. merchant service. In 1945 the E. was docked at Southampton and taken over by the U.S. Shipping Administration.

Europa Point, the most southerly point of the Straits of Gibraltar.

Europe is situated in the North Temperate zone. It is, except Australia, the smallest of the continents, but is both historically and politically the most important. Its area is 3,800,000 sq. m., about one-fourteenth of the total land area of the globe, the greatest length being 3400 m., and the greatest breadth 2400 m. Geographically, E. should be regarded as forming with Asia one great div. of the land surface of the globe. Its E. boundaries are the Caspian Sea, Ural R., and Ural Mts. These boundaries do not, however, mark a distinct difference either in flora or fauna; or of political divs., as Russia in E. and Siberia are united in the R.S.F.S.R. The other boundaries are: on the N. the Arctic Ocean, on the W. the Atlantic Ocean, on the S. the Mediterranean Sea, Black Sea, and Caucasus Mts. The boundaries of the R.S.F.S.R. however, extend beyond the Caucasus. The coast line of E. is greater in proportion to its size than that of the other continents, being some 50,000 m. The land is penetrated by large seas and gulfs, and its coast-line contains sev. large peninsulas, conditions which greatly favour its trade. The surface is divided into two parts, the great central plain, occupying two-thirds of its surface, stretching from the Ural Mts. to the Atlantic, and the highlands in the centre and the S. Apart from these two divs. is the mountainous dist. of Scandinavia, including the Brit. Isles. The S. system consists of the Alps, Pyrenees, Sierra Nevada, Apennines, Balkans and Carpathians. The great transverse watershed runs from N.E. to S.W., and the rvs. therefore flow generally N.W. and S.E. The two chief centres of this watershed are the Valdian uplands and the Alps. From the bogs and lakes of the moraine Valdes Hills flow the Volga (2100 m.) into the Caspian Sea, the Don into the sea of Azov, the Dnieper into the Black Sea, the N. Drwina

into the White Sea, and the W. Dwina into the Baltic. From the Alps flow the Danube (1700 m.) into the Black Sea, the Rhine into the N. Sea, the Rhône, Po, and Adige, into the Mediterranean. There are three prin. groups of lakes, viz. the Alpine lakes with Geneva, Constance, Lucerne, Neuchâtel in Switzerland; Maggiore, Garda and Como in Italy; Balaton in Hungary, the Scandinavian group with Wiener, Wetter, and Mälär in Sweden and Miosen and Randsfjord in Norway; the lakes of the central plain, Ladoga, Onega, Peipus, and Ilmen in Russia; and Saima and others in Finland. The is., with the exception of Iceland, lie near the mainland, the prin. being Great Britain and Ireland, Sardinia, Corsica, Sicily, Iceland, Nova Zemly, and Crete.

GEOLOGY.—In earliest geological times the coast of E. appears to have had a greater extension towards the N. and N.W., whilst the S. and E. dists. were under the sea. The oldest rocks, those of the Archæan and Palæozoic periods, are most continuous in the N. part of the continent, and extend over a large part of N. Russia, Finland, the Scandinavian Peninsula, and the N. and W. parts of the Brit. Isles. They also occur in Brittany, Central France, and Spain. In the rest of E. they form isolated clusters, but appear to be the foundation of the Alps, Pyrenees, Caucasian, and Ural ranges. The newer rocks of the Mesozoic and Cainozoic periods are generally found on the lower lying lands, but occur, nevertheless, in the Pyrenees, Alps, Caucasus, Carpathians, and Apennines. Their most continuous belt is in the central plain from the N. Sea into Russia. During the Cambrian period the S. part of E. was covered by a shallow sea, with a few is. of Archæan formation; while a large inland sea existed in the N. of Scotland, and apparently also in Wales. In the following, Silurian, period the continent was further submerged, the Brit. Isles disappearing almost entirely. This was apparently a period of great volcanic activity. Next came the Devonian and Old Red Sandstone periods. The latter was deposited in lakes and inland seas, while the former is of marine origin. Between the Silurian and Devonian periods the sea had receded and left great masses of land uncovered. The Atlantic Ocean, however, still stretched over the S. of England and the centre of E., while submarine volcanic eruption was frequent in Germany. The Carboniferous period marked a further extension of the sea, which covered Ireland and England, the low grounds of Central E. and a great part of Russia. Volcanic disturbance was frequent, and eventually the sea receded, leaving vast tracts of newly exposed lands. At the beginning of the Mesozoic era, large inland seas appear to have covered parts of E., including the S. portions of the Brit. Isles, and the lower course of the Rhine. Towards the close of the Triassic period, however, the land subsided, and allowed these lakes to become connected with the open sea. During the Jurassic period the Brit. Isles

seem to have risen above sea-level, with the exception of S.E. England. Similarly S. France and E. Spain were submerged, and the lower parts of N. Germany and Russia, Italy, Austria-Hungary, and the Balkans were also partly under water. This submergence appears to have lasted for a very lengthy period, but towards the close of the Jurassic period the land again rose, and in the early Cretaceous period Middle E. was generally dry. Later on, however, the land again subsided, leaving a vast sea over Central E., while the Mediterranean Sea was of far greater extent than at present, and covered part of France, Spain, Italy, and Greece, and was probably connected directly with the Indian Ocean. At the beginning of the Cainozoic period the land had again risen and left the centre of E. above sea-level. The S. lands were, however, represented only by is. and narrow peninsulas, a condition which persisted until the late Miocene period. During the Eocene period, the Alps, Pyrenees, and Carpathians were thrown up, and a further elevation of the same ranges was effected in the Miocene period. During the Pliocene period the bed of the Mediterranean was elevated, uncovering the lands of S. Europe. Violent changes of surface do not seem to have taken place in the Pleistocene period, but there were successive elevations and depressions. During this period the Brit. Isles appear at one time to have formed part of the continent, while at a later period large tracts of them again lay under water.

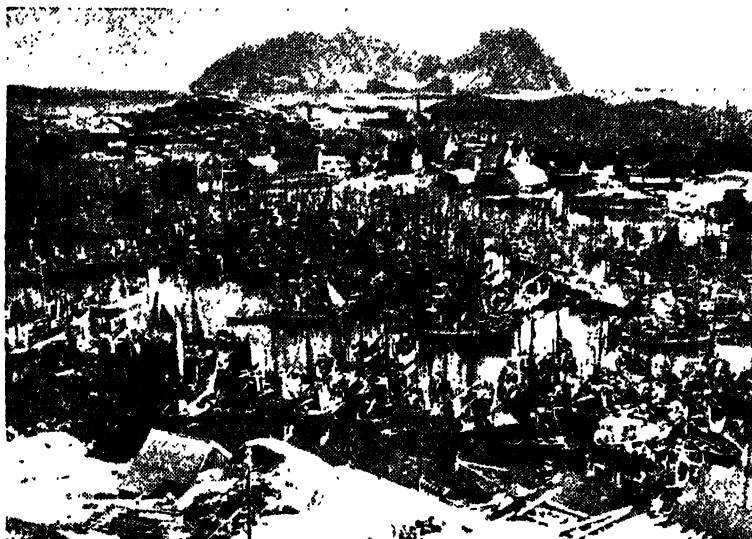
CLIMATE.—The climate of E. is very favourable. The major portion of the continent lies within the N. temperate zone, only parts of Norway, Sweden, and Russia being within the Arctic Circle. Owing to the fact that there is a long coast-line facing the Atlantic, and also to the presence of big inland seas, the climate is to some extent of an insular character. The Gulf Stream washes the W. shores and keeps their ports open all the year round. The prevailing winds come from the S.W., and are genial in character. In spring, however, cold E. winds blow from Siberia and lower the temp. considerably even in Western E. On the other hand hot winds blow across the Mediterranean from the sandy regions of N. Africa and impart to the S. shores of E. a sub-tropical climate. There are four regions of climate which may be distinguished: the S. along the shores of the Mediterranean, where there is seldom frost except in the mts.; the W., along the shores of the Atlantic and inward as far as the Oder, in which frost is not of long duration, and is not intense in degree; the E. or continental region, where the frost is more prolonged and the extremes of temp. are greater; and the N. region, along the N. coasts, where the climate is sub-Arctic. The rainfall diminishes from W. to E. Ireland has an ann. average of 208 rainy days, Scotland 170, and the region of the Volga 90.

POPULATION AND LANGUAGE.—The pop. of E. is some 550,000,000, or an average of 263 to the sq. m. The inhab. are divisible

into three main types. The Teutonic or Nordic type—long-headed, blond, tall, eyes blue, and nose aquiline—is spread over N.W. Europe, disseminating from Scandinavia and, in pre-historic times, from Russia. The virile Nordic people have unfortunately been much reduced through the ages by wars. Other long-headed men who in early times migrated into S. Europe now form the Mediterranean or Iberian type—long-headed, dark hair and eyes, medium height, slender, and broad of nose. The Pyrenean

elements among the E. European peoples are either of Mongolian or Tartar-Turkish origin. The former are represented by the Lapps and Samoyeds in the N. and the Kalmuk and Kirghiz peoples of the Caspian steppes in the S. Tartar-Turk is the name given to the scattered Turkish-speaking peoples found in Russia and the Crimea.

The prin. languages of E. belong to the Aryan family. Celtic is spoken in the extreme W., its branches being Cymric in Wales, Manx in the Isle of Man, Gaelic in



Royal Norwegian Embassy

THE NORTHERN COAST: NORWAY

A fishing fleet in the harbour of Værøy, Lofoten Islands

Basques are a sub-type of the Mediterranean stock. These two races of Europe are separated by the intermediate Alpine type of Central Europe—round-headed, broad-faced, light hair, grey eyes, medium height, rather stocky. This type prevails in N. Italy, Auvergne, Savoy, Switzerland, the Tyrol, Alsace-Lorraine, Württemberg, S. Germany, and Bavaria. Of the same stock as the Alpine race are the Slav-speaking peoples of Eastern E., divisible into two branches—the N. Slavs (Russians, Slovaks, Czechs, and Wends) and the S. Slavs (Serbs, Croats, Slovenes, and Bulgarians). Both are broad-headed, but the S. Slavs are taller and darker. The Slavs originally penetrated Russia from the S.W., overlaying the primitive, indigenous types, now represented by the long-headed Nordic Esths and Finns, to whom the Magyars and Letto-Lithuanians are racially related. The other primitive

the Highlands of Scotland, Erse in Ireland, and Armorican in Brittany. Teutonic is spoken in the centre, N., and W. Its main divs. are High Ger. in Germany proper, Low in the plains, including Eng. and Dutch; Scandinavian in Iceland, Denmark, Norway, and Sweden. Slavonic is spoken in the E. countries by Russians, Poles, Lithuanians, Letts, Wends Czechs, etc., and the Rumanian languages in France, Spain, Portugal, Italy, Wallachia, Greece, and Rumania. Non-Aryan tongues are Magyar in Hungary, Basque in the Pyrenees, and Turkish in the peninsula.

RELIGION.—The European nations, with some exceptions (*see below*) are Christians. The three branches of Christianity are the Rom. Catholic, prevalent in Southern E., the Orthodox, known loosely as the 'Greek Church' in the E. countries, and the Protestant Churches in the N. and central countries. Soviet Russia has

no official religion. There were some 10,000,000 Jews in E. (1930) and 5,000,000 Moslems (Turks, Russian Tartars, Albanians, and some of the Slavs). The Kalzuks in S. Russia are Buddhists, while the Samoyeds and some of the Lapps and Finns are idolaters.

VEGETATION.—Vegetation is generally very rich in the S. and central countries, but is not so plentiful in the N. E. may be divided into three zones in this respect: the S., central, and N. In the S. countries, S. of the Alps, the trees are chiefly evergreens; among the cereals, rice, maize, millet, and wheat are grown, as well as the olive, grapes, oranges, lemons, figs, and

chestnuts, and to some extent the cotton shrub, date palm, and sugar cane. Most of these plants appear to have been introduced from Africa and Asia, while maize and the Amer. aloe have been brought from America. In the central countries the chief cereals are wheat, barley, oats, and rye. Here are found the richest wheat areas of the world, notably in the valley of the Danube and the blacklands of S.W. Russia. The chief fruits are the apple, plum, pear, and cherry, while the vine is cultivated to 50° N. The trees are deciduous, being chiefly oak, beech, birch, elm, and alder. In the N. countries the chief trees are pines, larches, firs, birches,

Country	Area in sq. m.	Population.	Census. (*estimate)	Density of pop. per sq. m.
Albania	10,629	1,120,000	1946*	105.4
Andorra	191	5,200		26.9
Austria	32,388	6,818,000	1946*	210.4
Belgium	11,775	8,512,000	1947	713.6
Bulgaria	42,796	7,022,000	1947	163.3
Czechoslovakia	49,355	12,164,000	1947	246.5
Denmark (inc. Faroe Is.)	17,116	4,074,000	1945	238.03
Eire	26,791	2,953,000	1946*	110.2
Finland	130,165	3,887,000	1947	22.2
France (inc. Corsica)	212,659	40,518,000	1946	190.5
Germany	355,934	66,003,000	1946*	185.4
Gibraltar	1.88	21,000	1947	11,170.2
Greece (inc. Crete and Dodecanese Is.)	51,182	7,300,000	1947*	142.6
Hungary	35,902	9,316,000	1941	259.5
Iceland	39,709	132,000	1946	3.3
Italy (inc. Elba, Sardinia and Sicily)	119,732.8	45,645,000	1947*	381.2
Liechtenstein	62	12,000	1945	196.9
Luxemburg	999	281,000	1945	282.9
Malta and Gozo	122	295,000	1946	2,420.05
Monaco	6	19,000	1946	32,070
Netherlands	12,868	9,452,000	1946	734.6
Norway (inc. Spitzbergen)	124,556.4	3,123,000	1946	25.08
Poland	121,131	23,929,000	1946	197.6
Portugal (inc. Azores and Madeira)	91,721.1	7,722,000	1940	84.2
Rumania	91,671	16,409,000	1945*	179
San Marino	38	12,000	1947	318.4
Spain (inc. Balearic Is. and Canary Is.)	195,504	27,552,000	1947*	140.9
Sweden	173,378	6,763,000	1946*	42.7
Switzerland	15,944	4,265,000	1941*	268
Trieste	320.6	2,625,000	1946	818.8
Turkey in Europe	9,256	1,493,000	1945	161.4
United Kingdom (inc. Isle of Man and Channel Is.)	92,205	49,318,000	1946*	522.5
U.S.S.R.:				
Armenia	11,640	1,281,000	1939	110.1
Azerbaijan	33,460	3,209,000	1939	95.09
Byelorussian S.S.R.	81,090	10,100,000	1940*	128.3
Estonian S.S.R.	17,610	1,120,000	1940*	630.6
Georgia	37,570	3,542,000	1939	94.6
Karelo-Finnish S.S.R.	69,720	900,000	1939	12.9
Latvian S.S.R.	24,840	195,000	1940*	7.9
Lithuanian S.S.R.	31,600	2,879,000	1940*	91.1
Moldavian S.S.R.	15,200	2,200,000	1940*	166.7
R.S.F.S.R. in Europe	6,609,000	109,279,000	1939	16.5
Ukrainian S.S.R.	225,200	38,500,000	1940*	126.6
Vatican City	17	450	1940*	2647
Yugoslavia	96,000	15,324,000	1947*	159.6

and willows, which become more stunted in size as the N. is reached, and give place to mosses, lichens, and dwarf shrubs. Barley, rye, oats, and potatoes are the prin. objects of cultivation. In the N. of Russia exists the region of the Tundras, dreary wastes of ice and rock, where only stunted shrubs, lichens, and mosses are found. In the S.E. of the same country is another well-marked region, the Steppes, broad treeless plains, which, during the winter, are covered with snow. In the early summer, however, the Steppes are covered with grasses, which afford a rich supply of hay.

ANIMALS.—There are very few species of wild animals now left in Europe, and those that still remain are few in number. The bison exists in Lithuania and the Caucasus; the brown bear, wolf, and wild boar are found in the larger forests. The reindeer and elk dwell in the northern countries, while the stag, fallow deer, and roebuck exist in Central E. The chamois is hunted in the Alps and the Carpathians, and the ibex in Sardinia. The fox and lynx are also found. The Barbary ape exists only on the Rock of Gibraltar, and the beaver is sometimes seen in S. Russia. Of domestic animals the chief are the horse, donkey, cow, sheep, pig, goat, dog, cat, and reindeer. Silkworms are also reared in Italy and France. Web-footed birds, such as the wild duck and the goose, abound in the N. seas, while the vulture and the eagle may be seen in the Alps and S. ranges. The seas contain numerous kinds of fish, which are of great value as foods. In the N.W. seas the herring, mackerel, cod, haddock, sole, and pilchard are caught; in the Mediterranean the tunny, sardine, and anchovy. Salmon is abundant in N. and W. rivers. In the Arctic seas the whale, seal, porpoise, and walrus are obtained. Oysters are especially cultivated round the coast, and other shell-fish, such as the lobster and crab, are caught in large numbers.

MINERALS.—E. possesses vast deposits of minerals, but is very poor in precious stones. Coal is abundant in Great Britain, Germany, France, Belgium, Austria, and Russia. Iron is found chiefly in Great Britain, Germany, France, Belgium, Sweden, Austria, Russia, and Spain. Copper is found in Spain, Portugal, and Germany, and lead in Germany, Spain, and England. Zinc is chiefly found in Germany, Belgium, Great Britain, and France. Gold is mined in the Ural Mts. and silver in Germany and Austria. Platinum comes from the Ural Mts., quicksilver from Spain. Salt is produced in the Great Britain, Germany, Russia, France, Spain, and Italy. Sulphur is obtained from Sicily, and graphite from Bavaria and Austria. Transcaucasia is rich in oil, copper, and manganese.

POLITICAL DIVISIONS AND CONSTITUTIONS.—The countries of E. with their areas and pop. are shown in the table opposite. The First World War, 1914–18, resulted in the creation of seven 'succession' states out of the former Tsarist and Hapsburg empires:—in N.E. Europe the four Baltic Republics of Finland, Estonia,

Latvia, and Lithuania, and in Central Europe, Poland, Czechoslovakia, and Yugoslavia. In 1940, however, Finland lost a great part of its E. ter. in the Russian invasion of that year, it being constituted as the Karelo-Finnish S.S.R. The E. Baltic States (Latvia, Estonia, and Lithuania) were absorbed by Russia in the Second World War after being overrun in 1941 by the Gers. Poland was partitioned in 1941 between Germany and Russia but restored to nominal independence in 1945 subject to losses of ter. to Russia in the E. and gains in the W. at the expense of Germany. The remainder of Russia-in-E. consists of Russia proper or R.S.F.S.R. (part), Armenia, Azerbaijan, Byelorussia or White Russia, Moldavia, Georgia, and the Ukraine. In the Balkans the Serbs, Croats, and Slovenes were united in the kingdom of Yugoslavia, while Rumania and Greece were enlarged, Bulgaria reduced, and the small kingdom of Albania created. Albania was annexed by Italy in April 1939, but in 1944 the country was liberated by Allied and patriot forces. Austria and Hungary were made two small independent republics, and an enlarged Italy now borders on Yugoslavia. On March 13, 1938, Austria was annexed by Germany and incorporated into the Reich under the name of Ostmark, but liberated in 1945. Alsace-Lorraine was restored to France. The dominant factor in the reconstruction of E. has been racial nationality, but Memel and Danzig were, for a time, Free Cities, and the demilitarised straits of Constantinople were placed under international control. Both Memel and Danzig have now reverted to Germany, while Turkey received the right to fortify the straits. Trieste was constituted as a Free Ter. in 1947.

For the gov. of the various states of E., see separate articles.

HISTORY.—From the Greek *Communities to the Crusades.*—The hist. of E. begins with the Gk. communities, and its subsequent culture has been to an incalculable extent indebted to Grecian standards. When in the fifth century B.C. E. was threatened by the Asiatic hordes of the king of Persia, the Gk. communities united against the common foe and averted the danger by their signal victories at Marathon (490 B.C.), Salamis (480), and Plataea (479). Though capable of joint action in times of great peril, Greece was not a corporate whole, but a collection of small independent cities, each striving for supremacy over the others. This supremacy was at first obtained by Athens. Her power was, however, envied by the other Grecian cities, and at the end of the Peloponnesian war, which lasted twenty-eight years, Athens was taken by Lysander, the Spartan general, and its democratic gov. destroyed (404 B.C.). The Spartans, owing to the rigid military training of their citizens, managed to remain supreme for some thirty years, when Epaminondas, the Theban general, inflicted a series of defeats upon them. The internal struggles of the peninsula made it an easy prey for the rising power of

Macedonia, and when Philip was succeeded by his son, Alexander, the latter was master of almost the whole of Greece. His marvellous victories in Asia (334-323 B.C.) led to no decisive result, and his empire was upon his death speedily broken up by the contending generals.

With the fall of Greece came the growing might of Rome, which, in the fourth and third centuries B.C., had conducted a series of successful wars against the neighbouring Lat. and Samnitan tribes, and thereby made itself the leading state in Italy. Its expansion brought it into conflict with the Grecian cities in the foot of Italy, and they sought help from Pyrrhus, king of Epirus, the most renowned general of his time (281 B.C.). Even Pyrrhus's ability was, however, no match for the tenacity of the Romans, and when he left Italy (274 B.C.) the remaining states soon acknowledged Rome's supremacy. The latter's triumph only brought her into conflict with Carthage, which, situated upon the African coast near the modern Tunis, was at that time mistress of the E. Mediterranean. The contest that ensued was one between the two rival civilisations of the Semites and the Aryans, and determined the future hist. of the world. The first Punic war lasted from 264 to 241 B.C. Success at first fluctuated, owing to the superiority of the Carthaginians upon the sea. The Romans, however, with undaunted energy, built fleet after fleet, utterly defeated their opponents upon their own element, and obtained as their reward the adjacent is. of Sicily. Carthage, however, again returned to the attack, and the military genius of Hannibal, during the second Punic war (218-201 B.C.), shook the power of Rome to its foundations. But in spite of awful disasters at Trasimene and Cannae, the Romans never yielded, and when Hannibal's brother, Hasdrubal, was defeated and slain with a second invading army at the battle of the Metaurus (207 B.C.), the tide turned steadily against the Carthaginians. A third war saw the total destruction of Carthage (156 B.C.). Its greatest rival vanquished, Rome went from conquest to conquest; Greece, Spain, Macedonia, Asia Minor, and N. Africa fell under her sway. Her political institutions were introduced throughout S. Europe. Her conquests, however, only aggravated the cleavage between the aristocratic and democratic portion of her populace, while her huge armies prepared the way for a military dictatorship. Julius Caesar's ambition and the astuteness of Augustus estab. the Rom. empire.

The transfer of the cap. to Constantinople in A.D. 323 led subsequently (A.D. 395) to the div. of the Rom. dominions into the empires of the E. and W., and both portions were soon to suffer the irruptions of the savage hordes from the N. The direct cause of these irruptions was the invasion of E. by the Asiatic tribes of the Huns under Attila (A.D. 451), which set the tribes of Central E. in motion and flung them upon the Rom. frontier. In the general upheaval, Britain fell to the

Angles and the Saxons, Gaul to the Visigoths, Burgundians, and Franks (the latter of whom also conquered W. Germany), Italy to the Ostrogoths, and N. Africa to the Vandals. These barbarians, though they overthrew the Rom. power, nevertheless had respect for Rom. institutions, and kept up the fiction of the Rom. empire long after the reality had passed away. In the midst of the disruption the Christian church maintained its unity, and the pope finally claimed the right of disposing of the imperial crown. During the sixth century Italy was perturbed by the invasion of the Lombards, while in the eighth century the Moslems swarmed into Spain and Gaul, to be checked ultimately at Tours by Charles Martel (732). The latter's triumphs were continued by his grandson Charlemagne, who succeeded in establishing a powerful empire throughout Central E. from the Elbe to the Danube, and was crowned emperor of the W. by Pope Leo III. (Dec. 25, 800).

Charlemagne's vast empire was divided by his grandsons into France, Lotharingia, and Germany, Lotharingia ultimately being parcelled out between France and Germany. The next centuries were occupied by struggles between the monarchs and their feudal lords, the latter increasing their power at the expense of the former. During the ninth and tenth centuries occurred the raids of the Northmen, who, sailing from Scandinavia, estab. themselves in Normandy and S. Italy and harassed Great Britain, which, during the following century, was destined to fall to one of their descendants, Wm. of Normandy. From the end of the eleventh century till the latter half of the thirteenth, E. was agitated by the organisations of the crusades, which had the effect of bringing the warriors of various nations into touch with one another, and thereby did much to promote medieval culture. The fourth crusade (1202-4) was especially remarkable, because the crusaders were diverted from their true goal to the capture of Constantinople, and estab. a Fr. empire in the Balkans which lasted some sixty years. The Ger. kings still claimed for themselves the title of emperors of the W., but their power was very unsubstantial and their influence greatly weakened by the conflict with the popes over the question of investiture. In Spain a succession of small states was formed as the country gradually freed itself from the Moorish yoke, while in the E. of Europe the knights of the Teutonic order, whom the failure of the Crusades had left without occupation, turned their attention to the neighbouring country of Prussia and converted the Wends to Christianity.

From the Hundred Years' War (1337-1453) to the Seven Years' War 1756-63.—The Hundred Years' war (1337-1453), which the Eng. kings waged against France in prosecution of their claim to the Fr. throne left that country far more unified than it had been before, and the crafty policy of Louis XI. broke down the power of the big feudal lords. His successors were therefore free to devote themselves to foreign conquests. Their attacks

on Italy, however, brought them into conflict with Charles V., who had inherited the Netherlands, Spain, Naples, and Austria, and was elected emperor of Germany in 1519. His son, Philip II., succeeded to the hereditary dominions, but the imperial crown passed to the Hapsburg family. During the fifteenth century the Ottoman Turks captured Constantinople (1453), and spreading northward, conquered the whole of the country up to the walls of Vienna. Their severance of the connection of E. with the east, led to the great overseas discoveries by the nations of the W., while Gk. fugitives carried to Western E. the accumulated treasures of learning of the eastern empire, and so brought about the Renaissance and later the Reformation. Spain, the most ardent defender of Catholicism, was weakened by the loss of the Netherlands and by Eng. attacks upon her colonies, while in the seventeenth century the Portuguese reasserted their independence. In France the religious wars led to the estab. of the Bourbon dynasty and paved the way for the reign of Louis XIV. In Germany the Protestant states were for a time in serious jeopardy, but were rescued by the military genius of their Swedish ally, Gustavus Adolphus. The treaty of Westphalia (1648) left the land in a most exhausted condition. Sweden, however, gained Upper Pomerania, Wismar, Stettin, and Bremen. By the defeat of Denmark in 1643 it had also increased its dominions, and was now the leading Protestant power in E. In a later war (1657-58) Denmark was forced to surrender all its remaining Swedish provs., and a further war stripped Poland of Estonia and Livonia. Sweden's power was, however, broken by its king, Charles XII., who after successfully defeating a coalition of Russia, Saxony, and Denmark, led his army into S. Russia, where he was utterly defeated by Peter the Great at Pultowa (1709). France, which by the treaty of Westphalia had received the prov. of Alsace, was the strongest power in E., and shortly afterwards defeated Spain, forcing her to the disadvantageous peace of the Pyrenæes (1659). Shortly afterwards Louis XIV. married the Sp. Infanta Maria Theresa, who became the heiress of the Sp. throne upon the extinction of the male line. The Fr. invasion of Flanders had, however, already raised the jealousy of the other Powers and led to a triple alliance between England, Sweden, and Holland. When Louis's grandson, the duke of Anjou, was proclaimed heir to the Sp. throne, a new coalition was formed (1701) between England, Holland, and Austria. In the campaign which ensued, the military genius of the duke of Marlborough proved superior to that of the Fr. generals, and after defeats at Blenheim, Ramillies, Oudenarde, and Malplaquet, Louis made peace. The King of Spain renounced his right of succession to the Fr. throne, and surrendered the Netherlands, Naples, and Milan to Austria.

While Louis's wars were exhausting France, Prussia was gradually growing in strength. This duchy fell by inheritance

to the Elector of Brandenburg in 1618, and its independence of Poland was estab. by the great elector Frederick Wm. in 1656. In 1700 Frederick III. took the title of king of Prussia. Later on, in 1740, Frederick the Great suddenly invaded Silesia, and brought on the Seven Years' war (1756-63), in which he successfully defended his capture against Austria, France, and Russia. The latter country had steadily risen in importance since the battle of Pultowa had overthrown Swedish supremacy. Peter the Great had extended his dominion to the Baltic, founded St. Petersburg, and introduced the methods of W. civilisation. In 1772 Frederick the Great agreed with Austria and Russia to divide Poland among their three kingdoms. During the Seven Years' war, England had taken the side of Prussia, and had captured Canada and India from France. The reign of Louis XV. was marked by misfortune and extravagance, and brought France into a state of impoverishment and bankruptcy from which it only emerged by the convulsion of revolution.

From the French Revolution to the Franco-Russian War, 1871.—It is impossible to appraise accurately the importance of the Fr. Revolution. For France itself it meant a complete rupture with the monarchy tyranny of the past. With the monarchy succumbed the aristocracy and the clergy. The intensity of the convulsion was so great that the rest of E. thought that the country must be prostrate, and was surprised and alarmed to find it arise to a career of conquest. The enthusiasm of the people created a succession of victorious armies with capable generals to lead them. Hoche, Pichegru, and Moreau were only eclipsed by the far greater genius of Napoleon, whose military daring changed the map of E. He extended his rule over all Germany W. of the Rhine, a considerable part of N. Germany, and the major part of Italy; made his brother-in-law Murat king of Naples, his brother Joseph king of Spain, and another brother, Louis, king of Holland. He also placed one of his marshals, Bernadotte, upon the throne of Sweden. England remained free from attack as a result of the naval victories of the Nile (1798) and Trafalgar (1805), and was able to keep Napoleon's ablest marshals well occupied in Spain during the Peninsular war. Prussia and Austria suffered terribly, however, and the lesser states were formed into a Confederation of the Rhine under Napoleon's patronage. The attempt to ruin England, by the so-called Continental system of refusing to allow her to trade, was quite unsuccessful and only galling to Napoleon's unwilling confederates. Upon the weakening of his power by the disastrous Russian campaign of 1812, the vanquished nations again rose into revolt and the campaigns of 1813 and 1814 determined the issue in their favour. Napoleon's escape from Elba and his brief return to imperial power only culminated in the disaster of Waterloo, and cost Ney and Murat their lives. At the

Congress of Vienna, France was reduced to the limits of 1790 and the map of E. redistributed. The Netherlands became a separate kingdom which lasted until 1830, when the Belgians threw off the alliance and estab. a kingdom for themselves. The Ger. states formed a loose confederacy under the presidency of Austria, while Italy was partitioned under princes, the Venetian provinces remaining under Austrian control. The Holy Alliance formed between Russia, Austria, and Prussia for the administration of their respective kingdoms according to the principles of Christianity became the greatest factor in furthering reactionary measures and impeding the

the jealousy of Austria, found expression in the Vor-Parliament of Frankfurt and in the formation of the Ger. National Assembly. In 1849 the Hungarians revolted from Austria and waged a successful conflict until Russian troops reduced them to surrender. In France a wave of enthusiasm had resulted in the nephew of the great Napoleon being elected president, and by the end of 1852 he had succeeded in becoming emperor. To retain his position he kept the nation's thoughts fixed upon foreign affairs. In 1854 he joined with England to prevent Russia from aggrandising itself at the expense of Turkey, and so brought about the Crimean War. In 1859 he helped the



Louvre

NAPOLEON'S RETREAT FROM MOSCOW
'1812' by Meissonier

growth of constitutional liberty. In 1827 Greece recovered its freedom by the intervention of France and England, whose fleets defeated the Turks at Navarino. In 1830 the Fr. rose against the reactionary rule of Charles X. and chose Louis Philippe, the son of Philippe Egalité, as their ruler. In spite of attempts at liberal administration, the reign of the citizen king became increasingly unpopular, and he was forced into exile in 1848.

This was the signal for which E. was waiting. The whole period from 1815 to 1848 was one in which the nations had endeavoured unsuccessfully to wrest constitutional liberty from their despotic rulers. With the formation of the second Fr. republic, the symptoms of unrest became too ominous to be stifled. The smaller Ger. states wisely gave way, and in 1850 the king of Prussia granted a constitution, the king of Denmark having already done so in 1848. The desire for Ger. national unity, though thwarted by

king of Sardinia, who had become the champion of the movement for a united Italy, in his war against Austria, and received Nice and Savoy as his reward. The It. national movement, fostered by Mazzini, was powerfully helped by Cavour, the Sardinian statesman, who earned the gratitude of Franco and England by his help during the Crimean War. The victories of France and Sardinia in 1859 at Magenta and Solferino added Parma, Modena, and Tuscany to Sardinia, while Garibaldi's expedition of 1860 led to the further addition of Naples and Sicily. Austria, however, was still left in possession of the Venetian dominions, and the pope held the papal states. In 1863 Napoleon was induced to set up Archduke Maximilian of Austria as emperor of Mexico under Fr. protection, and the latter's capture and execution by the rebels greatly injured the Fr. emperor's prestige. In the meantime, Prussia had gradually ousted Austria from supremacy

in Ger. affairs. The attempt of Denmark to incorporate the Ger. duchy of Schleswig into the kingdom led to the declaration of war by Prussia and Austria, and to the capture of Schleswig-Holstein. The administration of the latter soon provided Prussia with an excuse for war, which was declared in 1866. The Austrians were completely defeated, and the Its., who sided with Prussia, captured Venice. Hanover, who had supported Austria, was annexed to Prussia. The question of the Sp. Succession in 1870 led to the Franco-Prussian War. The peace of 1871 added Alsace-Lorraine to the Ger. empire, which was formed during the course of the war under the leadership of Prussia, Austria having henceforth no voice in Ger. affairs. The withdrawal of the Fr. garrison from Rome enable the It. state to make that anc. city her cap. and seat of gov. By the Lateran Treaty (1929) the pope acquiesced in this arrangement.

From the Balkan War (1912) to the 'Armed Peace.'—During the latter years of last century, the principal readjustment of European ter. was in the Balkan peninsula. In 1859 the duchies of Moldavia and Wallachia were united into the kingdom of Rumania. The independence of Rumania and Serbia was recognised by the Treaty of Berlin in 1878, after the Russo-Turkish War, when Bulgaria was made a principality under the suzerainty of Turkey. In 1885 Bulgaria annexed E. Rumelia, and in 1908, taking advantage of the annexation of Bosnia and Herzegovina by Austria, formally asserted her independence of Turkish rule. During the autumn of 1912 an alliance was formed between Bulgaria, Greece, Serbia, and Montenegro against Turkey, and the whole of the Turkish dominion in E. captured, with the exception of a small ter. around Constantinople and the sea of Marmora. The question of apportioning the captured ter. led to a quarrel in which Bulgaria attacked Greece and Serbia, and after a month of fierce fighting (July, 1913) was compelled to come to terms by the treaty of Bucharest (see BALKAN WARS). Austria, supported by a Conference of Nations, prevented Serbia from gaining access to the Adriatic through Albania, thus further stimulating the anti-Austrian propaganda already strong in Serbia (see also FRANCIS FERDINAND OF AUSTRIA). Turkey-in-E. was restricted practically to Constantinople, but Turkey was befriended diplomatically by the Central Powers, Germany and Austria, while England's former support of Turkey against Russia was withdrawn after the Armenian atrocities of 1895. The div. of sympathy in the Balkans was the epitome of the state of affairs throughout E. Germany and Austria had formed a Dual Alliance since 1879, and in 1882 this had been extended to include Italy, forming a Triple Alliance (q.v.) of which the terms were secret. On the other side there was the Entente Cordiale (q.v.) between France and England, an agreement (1904) which settled old quarrels, leaving France a free hand in Morocco and England in

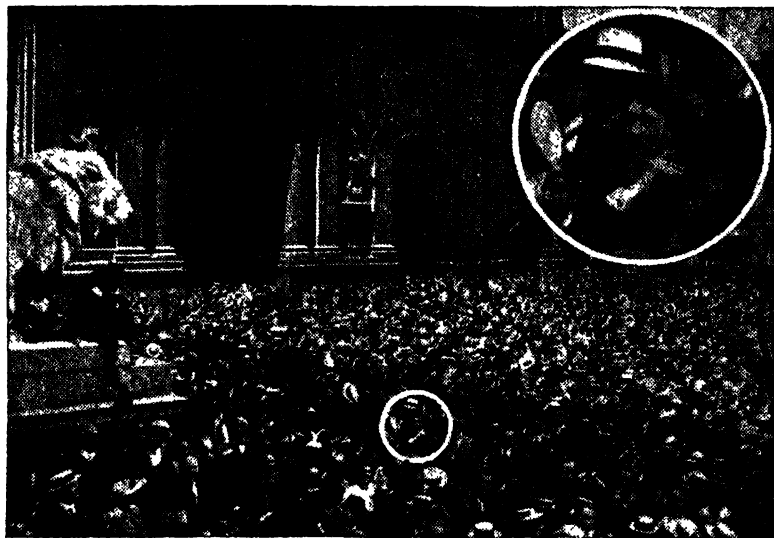
Egypt. England had sought this agreement with France as a reply to the Ger. naval policy, which was to challenge England's supremacy on the seas. Germany came forward as the champion of Morocco against Fr. intervention, and in the indecisive diplomatic struggle which ensued at the Conference of Algeiras (q.v.) (1906) Eng. sympathy was with France. England, however, by the terms of the Entente, was not bound, except morally, to undertake concerted action with France against Germany or any other country. A more definite agreement assuring mutual aid in the event of Ger. aggression had existed between France and Russia since 1894, and this was followed in 1907 by an Anglo-Russian treaty, somewhat counterbalanced by the Anglo-Japanese Treaty (q.v.) contracted in 1902. England formed these alliances, as Germany had already refused a *rapprochement* at the beginning of the century, and for the first decade there was such growing distrust between the Powers that this period is known as being one of 'Armed Peace.'

From the opening of the First World War (1914) to the Battle of Jutland (May 31, 1916).—The only gov. which viewed the prospect of war with complacency was that of Count Berchtold (q.v.) in Austria-Hungary. Serbia had been cheated by Austria of the full fruits of victory in the Balkan Wars, and one of sev. Serbian plots resulted in the assassination of the Archduke Francis Ferdinand, heir apparent to the Austrian monarchy, and his wife on June 28, 1914, at Sarajevo in Bosnia. On July 23 Austria delivered an ultimatum to Serbia, with an order of compliance within forty-eight hours. To the impossible terms dictated Serbia was conciliatory, but despite Eng., Fr., and It. mediation and half-hearted pacification by Germany, Austria declared war on Serbia on July 28, Russia mobilised, and on July 31 war was declared between Germany and Russia. France determined to stand by her Russian alliance, and Germany declared war on France on Aug. 1. The same day the Ger. ambas. in London attempted to obtain Brit. neutrality on the promise of respecting Belgian ter., but England gave no guarantees, and the Ger. Chancellor came to regard the treaties assuring Belgian neutrality as a 'scrap of paper' for which England ought not to go to war. However, when Germany invaded Belgium, England declared war on Germany on Aug. 4, 1914. The Belgian route was only one direction of the Ger. march on Paris; a second div. of the Ger. army advanced through Luxembourg, and a third through Lorraine towards Nancy. Belgium offered a stout resistance, but was speedily overcome, and the Ger. advance continued until checked within 52 kilometres of Paris. On Sept. 6 began the battle of the Marne (q.v., and see also under FRANCE AND FLANDERS, FIRST WORLD WAR CAMPAIGNS IN, 1914-18). Meanwhile the pact of London was signed on Sept. 5 between England, France, and Russia, whereby each country engaged not to make a separate peace. Japan, which had come into the war on Aug. 15 by the

terms of the Anglo-Japanese Alliance, acceded to the Pact a year later. Germany was relying on the sultan of Turkey, who was bound by a treaty of Aug. 2, 1914. This treaty was secret, and Allied diplomacy was directed towards securing Turkish neutrality. Attacks on Russian Black Sea tns. caused Russia to declare war on Turkey, and France and England followed suit. Turkey was by this time fully mobilised. Bulgaria, although Ger. in sympathy, remained neutral.

In Feb. 1915 the Allies attempted to win the Balkans by an attack on Constantinople. In March the naval effort

the Ger. counter-offensive, and there was no hope of Austria collapsing between a combined Russian and It. invasion. The Allies had had great hopes of Russia since the beginning of the war, hopes which had been somewhat fulfilled by the Russian successes in Galicia (*q.v.*) during the winter, 1914-15 (*see also* RUSSIAN FRONT IN FIRST WORLD WAR). Hindenburg's two Ger. invasions of Russian Poland, although the second was partially successful, both failed to take Warsaw. Meanwhile on the W. Front a position of stalemate had been reached. The battle of the Marne (*q.v.*) had been succeeded by that of the



1914 THE DECLARATION OF WAR IN GERMANY
A crowd (among whom was Adolf Hitler) in the Odeonsplatz, Munich, Aug. 2, 1914

to force the Narrows proved disastrous, over 2000 men and three first-class battleships of the Anglo-Fr. fleet being sacrificed in vain (*see under* DARDANELES). It was then hoped to succeed by land, but not until the end of April did the expeditionary force arrive (*see* GALLIPOLI CAMPAIGN). Italy, after prolonged diplomatic interchange with Vienna, decided to join the Allies, and concluded the secret Treaty of London, April 26, 1915. Trentino and Cisalpine Tyrol, Trieste, and part of the Dalmatian coast were promised to Italy, among other concessions, and these terms, together with the Allied obligations to Serbia, made it impossible to make a satisfactory offer to Bulgaria and Greece as the price of their intervention. Italy declared war on Austria-Hungary on May 23, 1915, but by this time the Russian advance was being checked by

Aisne (*q.v.*) Battle succeeded battle with no decisive result—Nouve Chapelle in March and Ypres (*q.v.*) in April, when poison gas was first used—but the Gers. were able to hold their positions on the W. Front while concentrating an attack on the E. In May and June 1915, coincident with the It. mobilisation, the Austro-Ger. army under Mackensen retook Lemberg (Lwów) and drove the Russians out of Galicia. Hindenburg met with equal success in Poland, and by Oct. all Poland and part of Courland and Lithuania were in Ger. hands.

Allied prestige was so low in 1915 that Germany was easily able to outbid the Allies in the effort to secure Bulgarian aid (*see* BULGARIA). A secret convention was signed between Bulgaria and the Central Powers on Sept. 6, 1915. On Oct. 14, when Bulgaria was mobilised, war was

declared on Serbia, and the Allies then declared war on Bulgaria. The Allies counted on Greece fulfilling her treaty obligations by aiding Serbia, but the Gk. Premier, Venizelos, whose sympathy was with the Allies, was forced out of office by King Constantine, who was a more cautious patriot, and Greece retained an armed neutrality which became a distinct menace. Serbia was overpowered on all sides and rapidly overcome. A small Allied expeditionary force failed to be of material aid (*see MACEDONIAN FRONT IN THE FIRST WORLD WAR*), and by the end of Dec. the Allied troops abandoned their foothold in Gallipoli in order to reinforce the garrison at Salonika. In Jan. 1916 Montenegro was overrun by an Austrian army, and in Feb. the Its. were forced to evacuate Albania. Simultaneously the Ger. army was attempting a decisive blow on the W. Front, and from Feb. to June terrific and costly assaults were made against the Fr. fortress of Verdun (*q.v.*). On March 27, 1916, the first general war council of the Allied Powers was held in Paris, followed in April by an Allied Inter-parl. conference, and in June by an economic conference. The report of serious food shortages among the pops. of Central Europe decided the Allies to plan simultaneous drives on the Fr., Russian, and It. fronts. A recuperated Russian army under Brusilov (*q.v.*) made successful advances into Galicia during June, July, and Aug., and captured the prov. of Bukovina (*q.v.*). At the same time, Cadorna (*q.v.*), the It. general, was driving back the weakened Austrian army on the Trentino front, while reserving the major effort to be made on the Isonzo front. By Aug. the heights W. of Isonzo (*q.v.*) were carried and the prov. of Gorizia (*q.v.*) was won. These successes decided Rumania to enter the war on the side of the Allies. A treaty between Rumania and the Entente was signed on Aug. 17, 1916. Rumania, assured of support from the Russian army in Bukovina and the Anglo-Fr. army in Salonika, threw the whole of its army into Transylvania (*see RUMANIAN FRONT IN THE FIRST WORLD WAR*). A supreme and unexpected effort by the Ger. General Staff under Hindenburg succeeded in crushing Rumania, with the help of a Bulgarian and Ger. army under Mackensen, who attacked Rumania from the S. and entered Bucharest on Dec. 6. Meanwhile the Allied effort towards forcing a military decision was being made on the W. Front, and the Battles of the Somme (*see SOMME, BATTLE OF THE*) were waged from June to Nov., battles which proved terribly costly and indecisive. On the sea Germany was endeavouring to overcome Brit. supremacy by the use of submarines, but became embroiled with neutral countries. Portugal joined the Allies in March 1916, and the U.S.A., already angered by the sinking of the *Lusitania* (*q.v.*) in May 1915, issued further warnings to Germany to respect merchantmen. The Grand Fleets of England and Germany only encountered each other once during the war, on May 31, 1916 (*see JUTLAND, BATTLE OF*).

German offer of a diplomatic peace—Allied offensive of 1917—Russian Revolution—Treaty of Brest Litovsk.—The year 1916 ended in a position of stalemate, with widespread depression among the Entente Powers. There was a general political reshuffle. In England during Dec. Asquith was succeeded as Premier by Lloyd George, and Grey as foreign secretary by Balfour. Lloyd George formed a coalition War Cabinet, and in France Briand, while remaining Premier, formed a new Fr. War Cabinet on much the same lines. Joffre retired from the command of the Fr. army, and was succeeded by Nivelle, whose counter-attack at Verdun in Oct. and Nov. was the only Allied victory of 1916 which could offset the defeat of Rumania. In Russia the corrupt and ineffective gov. was beginning to meet openly with the opposition it merited. In contrast to the pessimistic criticism of the war govts. prevailing in the Entente, the Central Powers were consolidated in an optimism which proved to be unfounded. The Ger. gov., in which Von Jagow, foreign secretary since 1912, was succeeded in Dec., 1916 by Zimmermann, believed itself in a strong position which would make possible a successful diplomatic peace. The trend towards peace had gathered strength in Austria since the death of Francis Joseph (*q.v.*) and the accession of the emperor Karl on Nov. 21, 1916. Berchtold had been succeeded as foreign minister by Burian early in 1915, but Karl in his efforts to hold the Dual Monarchy together by means of peace, was seconded by Czernin, who had displaced Burian. On Dec. 12, 1916, a proposal to hold peace negotiations was submitted by Bethmann-Hollweg (*q.v.*), the Ger. Chancellor, on behalf of the Central Powers. No terms were stated, and the offer was rejected by the Entente, who also made no terms beyond indicating the necessity for reparations and guarantees. The Allied refusal was represented in Germany as showing an aggressive militarist spirit, and allowed Gen. Ludendorff and the Emperor Wm. once more to stimulate the Ger. armies to resistance. Wilson, the President of the U.S.A., however, encouraged by Bernstorff (*q.v.*), the Ger. ambas., endeavoured on the strength of the Ger. peace proposals, to act as mediator and secure a 'peace without victory.' Both sides submitted their terms privately to President Wilson but they clearly conflicted, e.g. over the possession of Alsace-Lorraine. The Allies, however, on Jan. 10, 1917, assured the President of their adherence to his ideal of a League of Nations. Meanwhile Bethmann-Hollweg was overridden by Ludendorff (*q.v.*), who became in effect a military dictator. The immediate issue was the unrestricted use of submarines. Falkenhayn (*q.v.*), Ludendorff's predecessor, had protested against their restriction in 1915, and the Admiralty now promising to subdue England within five months, Ludendorff launched on Feb. 1, 1917, the unrestricted U-boat campaign. This decision annulled Bernstorff's effort to secure Amor. mediation, and on April 6, 1917,

America declared war on Germany. Ludendorff and Hindenburg calculated on winning the war before the intervention of America became effective, and in the first half of 1917 the submarine warfare was proving a serious menace. Moreover, the Allied offensive on the W. Front during 1917 proved the practical impossibility of piercing the Ger. lines, while Germany was relieved of a powerful enemy by the collapse of the Russian monarchy in the March Revolution (*see RUSSIAN REVOLUTION, THE*). The Tsar Nicholas II. was deposed, and a provisional democratic gov. was organised on March 15, and the U.S.A. were first among the Allied states to accord official recognition. The revolution had been supported by the military leaders, and it seemed that Russia would prosecute the war with renewed vigour. The foreign minister, Millyukov, issued a note to this effect, but Prince Lvov's Provisional gov. was broken up under the opposition of the Soviet Party, which represented the war-weariness of the Russian people. A reconstruction was attempted by Tcheidze and Kerensky (*q.v.*) on May 16, 1917, and a manifesto, disavowing all thought of a separate peace, appealed to the Allied democracies for a revision of war aims in accordance with the ideals of the Russian revolution. Kerensky made a great effort to discipline the army, and, with Brussilov as Chief of Staff, organised a campaign in Galicia in June 1917. This was at first successful, but misfortune developed into complete rout, and the Russians threw down their arms, refusing to fight. Russia was further disrupted by the movement towards autonomy among the Poles and Finns, the Letts of Courland, the Ruthenians in the Ukraine, the Estonians, the Lithuanians, and the Georgians of the Caucasus. The Provisional gov. was also severely attacked by the Bolsheviks (*q.v.*) (majority), the extremist section of the Soviet Democratic party. After the failure of the military offensive, Prince Lvov, head of the Provisional Gov., resigned on July 17, but an attempt by Lenin (*q.v.*) and Trotsky (*q.v.*), the leaders of the Bolsheviks, to seize the power was thwarted by Kerensky, who became head of the Provisional Gov. and virtual dictator. Kerensky, with the aid of Gen. Kornilov (*q.v.*), who had superseded Brussilov, then set up a military dictatorship, but later arrested Kornilov, and vainly tried to save his gov. by sympathising with the extremist faction. The Allied Paris Conference refused to revise war aims, thus disappointing the hopes of the Kerensky Gov., which was finally put out of power by a Bolshevik *coup d'état* on Nov. 7. Lenin estab. a dictatorship of the proletariat, and repudiated political democracy as it is understood in Western E. (*see RUSSIA*). Peace offers were at once made to Germany on a basis of 'no annexations and no indemnities,' and a conference was opened at Brest-Litovsk on Dec. 22, 1917. The Ruthenians (Little Russians) were represented, having formed the Ukrainian People's Republic on Nov. 30, and after the breakdown of negotia-

tions between Germany and the Soviet, Ukraina signed a separate treaty with Germany on Feb. 9, 1918. Meanwhile Finland had become an independent republic on Dec. 4, 1917, and Lithuania on Dec. 11. On Jan. 14, 1918, the conference of Brest-Litovsk came to an end, and in spite of the Russian attitude of 'neither peace nor war,' hostilities were resumed, and a military thrust into Russia during Feb. resulted in the Soviet submitting to the Ger. terms, March 13, 1918 (*see BREST-LITOVSK, TREATY OF*). Rumania, being isolated, had signed a peace treaty with the Central Powers on March 7 (*see BUCHAREST, TREATY OF*). Rumania and Russia being out of the war, Gen. Sarrail, commanding the Allied garrison in Salonika, was unable to take the offensive. Meanwhile the Allied support to the revolt which Venizelos had raised against the king reached the pitch of an armed occupation of Athens, followed by the forced abdication of Constantine, who retired in favour of his second son, Alexander, on June 12, 1917.

International Conference, Stockholm—American troops in France—Armistice of 1918.—The break-up of Russia into its constituent peoples was not without effect in Central Europe, especially in Austria-Hungary. The Emperor Karl had intrigued with the Entente to secure a separate peace during 1917, but in April of the following year Germany compelled him to dismiss Czernin from the post of Foreign Minister and to reinstate Burian, who was more in sympathy with pan-Germanism (*see under AUSTRIA-HUNGARY*). The Russian example stimulated the Socialists of all countries in their efforts towards peace, but there was strong animosity between the Socialists of the Entente and those of Germany and Austria, and the International Conference at Stockholm (1917) proved a failure. In Aug. 1917 the pope put forward a plea for peace, which was welcomed by Austria, but President Wilson replied that the action of the Ger. Gov. rendered a compromise useless. The defeatist movement was strong in the Allied countries, and in France Briand was put out of office; but by Nov. a reactionary Cabinet was formed under Clemenceau, who prosecuted the pacifists. In Oct. and Nov. the Gers. took advantage of pacifist propaganda in Italy, and Ludendorff planned to break through the It. line on the Upper Isonzo at Caporetto, where a crushing defeat was inflicted on the It. army (*see CAPORETTO, BATTLE OF*). It was hoped by putting Italy out of the war to save the integrity of Austria, and at one time, until the arrival of reinforcements, Venice itself was threatened. In this crisis a reorganisation of the It. ministry made Orlando Premier, and the Ita., together with the other Allied peoples, became convinced that a peace by compromise was futile. By Dec. the first drafts of Amer. troops were arriving to stiffen the resistance on the W. Front, where the Third battle of Ypres and the battle of Passchendaele had been waged, sanguinary and indecisive. On Jan. 8, 1918, President Wilson enunciated the

celebrated 'Fourteen Points' (*q.v.*), which were accepted as embodying the Allied war aims, and in one clause advocating the autonomy of the constituent peoples of the Dual Monarchy was spelt the doom of the Hapsburgs. Following on this came the Congress of Oppressed Nationalities, held in Rome in March 1918, and the pact of Rome was concluded between Italy and the Yugoslav peoples.

Germany, all but decisively victorious in Italy, and despite the partial failure of the submarine campaign, was to make one more supreme effort. With commanding strategy, Ludendorff and Hindenburg planned a colossal offensive at an unexpected point on the W. Front where the Brit. and Fr. armies joined. The attack was launched on March 21, 1918, against the central sector of the Allied lines between Arras and the R. Oise. The Brit. armies were rolled back, but the Gers. failed in their purpose of taking Amiens (*q.v.*). An order for conscription was passed by Parliament in London, and the result was further to antagonise the various Irish factions. One important result of the Ger. advance was the decision, at long last, to unify the Allied command under Marshal Foch. This had for long been advised by President Wilson, but beyond a conference at Rapallo on Nov. 9, 1917, between the Prime Ministers and Chiefs of Staff of France, Great Britain, and Italy, the formation of a Supreme War Council and a subsequent Allied Conference at Paris on Nov. 29, little had been done. In May 1918 the Gers. launched a second offensive against the Fr. lines on the Aisne and the Oise. Meanwhile Amer. reinforcements were arriving in numbers, and the Its. were checking the Austrian drive on the Piave R. On July 15, 1918, the Gers. began their third and final offensive in the second battle of the Marne. Foch's counter-attack with Fr. and Amer. troops proved successful, and by Aug. the Ger. armies were in retreat.

In the near East Foch planned a simultaneous offensive in Macedonia under Franchet d'Espèrey (*q.v.*) and in Syria under Allenby (*q.v.*). Bulgaria was put out of the war, an armistice being signed at Salonika on Sept. 30. A month later, following Allenby's successes in Syria, Turkey also signed an armistice. This defection of Germany's allies weakened the strong position Germany had gained among the former Russian dependencies. Its successes against Austria forced an armistice on Nov. 3, and the Dual Monarchy split up into its constituent states. Czechoslovakia emerged as a republic and Yugoslavia as a kingdom, while on Nov. 13 Ger. Austria was proclaimed a republic, and the well-intentioned Emperor Karl (*see* CHARLES) abdicated. Three days later Hungary also became an independent republic. In Germany events moved even more quickly. Ludendorff resigned on Oct. 27, and on the following day a naval mutiny at Kiel was the beginning of a widespread socialist revolution. On Nov. 7 Bavaria became a republic and the king fled, while two days later Wm. II.

also abdicated and a republic was estab. in Berlin. The Provisional gov. under President Ebert hastened to accept the Allied terms, and the Armistice was signed on Nov. 11.

Peace Conference—Treaty of Versailles, Treaty of Saint-Germain, and other peace treaties.—On Jan. 18, 1919, the Peace Conference formally opened at Paris, but the huge plenary sessions came to no decisions not already reached by the Council of Ten, which council was superseded in March by the still smaller Council of Four, consisting of President Wilson, Clemenceau, Lloyd George, and Orlando. On April 30 the Ger. delegation arrived in Paris to receive the terms of the treaty. Ger. criticism and protest led to a partial revision, mainly through fear of throwing Germany into anarchy, and the main concession to Ger. opinion was the grant of a plebiscite in Upper Silesia, which, together with E. Prussia, eventually decided for Germany (March, 1921). After a re-organisation of gov. Germany signed the treaty, together with all the Allied and Associated Powers, at Versailles on June 28, 1919 (*see* VERSAILLES, TREATY OF). In the forefront of the treaty was set the League Covenant (*see* COVENANT OF THE LEAGUE OF NATIONS). Although this was the result of President Wilson's idealistic purpose, he was no longer supported by the Amer. Senate, which refused to ratify the treaty. America accordingly concluded a separate peace with Germany and Austria. The treaty of Versailles was followed by the treaty of Saint-Germain, concluded with Austria on Sept. 10, 1919; of Neuilly with Bulgaria on Nov. 27, 1919; of the Trianon with Hungary on June 4, 1920; and of Sévres with Turkey on Aug. 10, 1920. The treaty with Hungary was delayed owing to the estab. on March 21, 1920, of a Soviet gov. under Bela Kun, who was only overthrown by the advance of Rumanian troops (*see* HUNGARY). He was succeeded by the Archduke Joseph, who formed a Prov. Gov. The treaty of Sévres was never ratified by Turkey, owing to the opposition of the Nationalists under Mustapha Kemal. Turkey resisted the attempts which Greece made to take over the new possessions awarded at the 1919-20 Peace Conference, and a Græco-Turkish war was only terminated by the revision in Turkey's favour of the treaty of Sévres by the terms of the Lausanne Treaty, July 24, 1923. The unratified treaty of Sévres had been designed to reduce the Transcaucasian ter. which Turkey had gained from Russia by the Treaty of Brest-Litovsk, but the newly-created Federal Republic of Transcaucasia could not resist the Turks, and in 1918 became disintegrated into the three Republics of Georgia, Armenia, and Azerbaijan. In 1919 the Caucasus became a sphere of Brit. influence and the Ukraine of Fr. influence. With the withdrawal of the Brit. troops the same year, Soviet Russia took over the country by force, and added the three Transcaucasian Republics to the U.S.S.R., at the same time concluding an agreement with Tur-

key (the Treaty of Kars, Oct. 13, 1921), whereby the boundaries were fixed and the Autonomous S.S.R. of Ajaria was created to include the Free Port of Batum. Turkey on Oct. 29, 1923, became a republic, and the sultan, Mohammed VI., fled from the country. In Greece, Venizelos failed to establish order and retired. On April 23, 1924, a republic was estab. by the Gk. electorate, but the following year Gen. Pangalos set up a dictatorship.

'Succession' States—Rise of Mussolini.

—The prin. results of the peace treaties were in geographical reconstruction. The treaty of Versailles confirmed the creation of the 'succession' states of Poland, Czechoslovakia, and Yugoslavia, and of the Baltic States, Estonia, Latvia, and Lithuania, while Danzig was made a Free City under the League of Nations. Rumania became enlarged by the possession of Bessarabia, Bukovina, and part of the Banat of Temesvar, while the Ukrainian Republic on Dec. 30, 1922, concluded an alliance whereby it became one of the federated states of Soviet Russia. The boundary between Italy and Yugoslavia on the E. coast of the Adriatic presented one of the most difficult problems of post-war E. The It. premier Orlando demanded the cession of Dalmatia and Fiume to Italy, the first-named transference being in accordance with the secret treaties of 1915 and 1917; but he was succeeded in July 1919 by Francesco Nitti. The unauthorised *coup d'état* of D'Annunzio (*q.v.*), who won a plebiscite in Fiume and raided Zara, upset the conciliatory attitude of the Nitti Cabinet; but although in Nov. 1920 Fiume (*q.v.*) was proclaimed a Free City under the League of Nations, it was not until Jan. 1924 that the problem was settled by an agreement made at Rome, whereby Fiume, although governed by Italy, should remain a free port to Yugoslavia. Italy immediately after the war had been upset by internal discord, the Socialists and the Fascists vying with each other in revolutionary ardour. The Fascist Party had come into being in March 1919 and professed an ideal similar to that which had inspired the Bolshevik movement in Russia and elsewhere. The Fascist leader, Benito Mussolini, organised an armed force of irregulars, known as Black Shirts, and these took an active part in furthering the revolutionary strikes of 1919 and 1920. In May 1921 a general election showed the country to be ready to return to constitutional normality, but an unreasoning fear of anti-nationalist Bolshevism still prevailed among the middle classes. Meanwhile the Fascist movement was assuming the proportions of an armed revolt, and his position being strengthened by a succession of parl. crises, Mussolini renounced his republican ideals, and his band of irregulars, armed with cudgels and castor-oil bottles, commenced their march on Rome. On Oct. 21, 1922, Mussolini entered Rome in triumph, and was invited by the king to form a ministry, thus legalising his position (*see FASCISM*).

Civil war in Ireland—First Meeting of the League of Nations—London Conference, Feb. 1920—San Remo Conference.—In the United Kingdom the coalition gov. was attempting to bring civil war in Ireland to an end by a compromise treaty (Dec. 1921) between England and the Republican gov. under President de Valera. The Irish Free State, thus created, was granted dominion status, and in 1922 a gov. was organised under Michael Collins; but the compromise remained unacceptable to the extreme Republicans and also to the Ulster Unionists (*see IRE and IRELAND*). Six cos. of Ulster remained part of the United Kingdom, but with legislative autonomy.

On the Continent of E. a series of international conferences was attempting to adjust the treaty of Versailles. The first meeting of the League of Nations was held at Paris on Jan. 16, 1920, with Léon Bourgeois, Fr. representative, as chairman (*see under LEAGUE OF NATIONS*). European diplomacy, however, was conducted by conferences outside the sphere of the League. On Feb. 12, 1920, a London Conference was held between the Premiers of Great Britain, France, and Belgium, and the foreign minister of Yugoslavia. Millerand had succeeded Clemenceau as Premier of France. The prin. decision of this conference was that Constantinople should remain Turkish. The next Allied Conference, held at San Remo in April 1920, was occasioned by military events in Germany. The militarist party in Germany had had a temporary success over the republic in the 'Kapp Putsch' of March 14-17, and a subsequent Spartacist (Communist) outbreak in the Ruhr was suppressed by the Reichswehr (regular Ger. Army), which, by entering the demilitarised zone on the r. b. of the Rhine, contravened Art. 42 of the treaty of Versailles. Fr. troops therefore occupied Frankfurt and Darmstadt (April 6, 1920). Disarmament was discussed at the San Remo Conference, and Germany was notified of the necessity of fulfilling all treaty obligations, but was invited to a conference at a future date. This conference was to take place at Spa, but previous to it a succession of inter-Allied conferences took place, concerned with economic problems, with the war (1920) between Poland and Soviet Russia, and the Near E. question. On July 5, 1920, the Spa Conference opened, but although the Gers. had great hopes that the hardships of their country would be relieved, the reparations question was aggravated by the hostile attitude of certain Ger. industrial magnates. A compromise was reached over the delivery of coal, and Germany agreed to deliver 2 million tons per month for six months, and the Allies to make Germany a loan dependent on the price of coal. By Dec. 1922, however, deliveries of coal were in arrears, and Germany was declared in default by the Reparations Commission, which had been set up to assess the amount of reparations, an exact figure not having been stated by the Allies at the Peace Conference. A conference between France and England

in Aug. 1920 led to a decision to give military support to the Poles, who accordingly won a victory against the Russians at the battle of the Vistula on Aug. 14.

Inter-Allied Conference on Reparations and Disarmament (1921)—Spa Agreement—Silesian Plebiscite.—The first Inter-Allied Conference of 1921, held at Paris on Jan. 24-30, was concerned with reparations and disarmament (see REPARATIONS). Briand was now Premier of France. The Paris Conference at which figures for monthly deliveries of coal after the Spa Agreement had expired were drawn up, was preparatory to the London Conference, Feb. 21 to March 14. Germany at London made counter-proposals to the Paris terms, but failing the unconditional acceptance of these terms Dusseldorf, Duisburg, and Ruhrort were occupied by Allied military forces on March 7. At a second Conference of London, April 29 to May 5, the Supreme Council of the Allied Powers delivered an ultimatum to Germany, threatening the occupation of the Ruhr unless Germany undertook fulfilment of all treaty obligations. The Ger. Gov. resigned, but a Cabinet was formed by Wirth in time to accept the ultimatum on May 11, a day after the expiry of the time limit. The subject of Ger. disarmament was discussed at a meeting of the Supreme Council at Paris Aug. 8-13, 1921. The chief business of the Paris Conference was the question of the partition of Upper Silesia. The plebiscite of March 20, 1921, had been in Germany's favour, but as France and England could not agree as to the boundary line to be drawn between Germany and Poland, the matter was referred to the League of Nations. The decision of the Council, issued on Oct. 20, 1921, prevented a rupture in the Entente.

Washington Conference, 1921—Reparations—Græco-Turkish War—Treaty of Lausanne.—On Nov. 12, 1921, the Washington Conference opened its first session for the discussion of disarmament and the problems of the Pacific. England was represented by Balfour, and Briand, the Fr. Premier, was present at the opening. The conference continued into 1922, and the prin. achievement was the Five-Power Pact between the U.S.A., the Brit. Empire, France, Italy, and Japan with regard to the limitation of cap. ships and aircraft carriers for a period of fifteen years. In 1929, however, naval disarmament was carried a stage further at the London Conference, opened on Jan. 21, when a Three-Power Pact was concluded between Great Britain, the U.S.A., and Japan with regard to limitation of cruisers, destroyers, and submarines.

To return to the reparations question of 1921, Briand on Dec. 18 conferred with Lloyd George, the immediate occasion being the Ger. admission of inability to pay the reparation instalments due in Jan. and Feb. On Jan. 6 a larger conference of all the Allied Powers, with an Amer. 'observer,' was held at Cannes. Besides reparations, the business of the Conference was to project a European Economic Conference to be held at Genoa. An

Anglo-Fr. treaty guaranteeing Brit. aid in the event of Ger. aggression against France was put forward by Lloyd George, but rejected by Briand as humiliating, there being no mention of a reciprocal obligation of France to support England. Briand was recalled to Paris on Jan. 11, 1922, on the false assumption that he was not protecting Fr. interests, and, being deposed from power, he was succeeded by Poincaré. Poincaré, who also acted as foreign minister, met the foreign ministers of Great Britain and Italy at Paris on March 22 in an attempt to bring the Græco-Turkish war to an end by negotiation. The attempt failed, and the war continued until Aug., when Turkey forced Greece to accept the Armistice of Mudania. The treaty of Lausanne followed in July 1923. The final act took place seven years later, in 1930, when a commercial convention and a pact of conciliation and arbitration were signed by Greece and Turkey.

European Economic Conference (1923)—Reparations—Occupation of the Ruhr—Davies Plan.—The European Economic Conference was opened at Genoa on April 10, 1922, and was attended by representatives of twenty-nine European states, including Russia, but excepting Turkey. The U.S.A. were invited but declined. The main business of the Conference was to explore the possibilities of renewing economic relations between Russia and the other countries of Europe. A draft treaty to this effect was put forward, but was rejected first by France and Belgium, then by the Soviet Gov. itself. The only tangible result of the Genoa Conference was a separate agreement between Germany and Russia, signed at Rapallo on April 18, for the mutual renunciation of reparations and the resumption of diplomatic and economic relations.

With regard to reparations, the issue became clearly defined as a conflict between the Eng. contention that only an economically stable Europe could enable Germany to pay her debts, and the Fr. point of view, which regarded Germany as already able to fulfil her obligations. Anglo-Fr. conferences were held in London on Aug. 7 and Dec. 9, 1922, and again in Paris on Jan. 2, 1923, when Bonar Law put forward a Brit. scheme of payments involving a four years' moratorium, which was rejected. The Reparations Commission had granted a moratorium, which had elapsed on Aug. 31, 1922, and Germany became liable to pay 500 million gold marks on Jan. 15, 1923. On Jan. 11 Fr. and Belgian troops were moved from Dusseldorf (occupied as a 'sanction' since March 1921) to Essen (see FRANCE; RUHR). The M.I.C.U.M. (Mission Inter-alliée de Contrôle des Usines et des Mines) was set up to supervise the production of coal in the Ruhr, but the Ger. Coal Syndicate, which was to take its orders from the M.I.C.U.M., moved its headquarters from Essen to Hamburg. This was the first step in the policy of passive resistance initiated by the gov. of Chancellor Cuno. Ger. officials refused to cooperate with the Fr., and by Jan. 30 a

state of siege was declared by the Fr. commander-in-chief, Gen. Degoutte (q.v.). Great Britain gave no diplomatic support to Poincaré's policy, and indeed Brit. protests only fell short of breaking the Entente relationship. From the Fr. point of view the pressure on the Ruhr was successful, and displayed the superiority of Fr. industrial ability. The Fr. victory remained a moral one, for the economic stability of Europe was much shaken. Germany seemed about to disintegrate, and after the order for passive resistance in the Ruhr was withdrawn by the Ger. gov. on Sept. 26, martial law was proclaimed throughout the country. Stresemann, who had succeeded Cuno as Chancellor on Aug. 12, held Germany together, and by the efforts of Luther, the finance minister, the currency was stabilised on the basis of the *rentenmark*. In Nov. Marx became Chancellor, but Stresemann remained in the gov. as minister of foreign affairs.

On Nov. 30 the Reparations Commission met and inaugurated two Committees of Experts. The first Committee held its inaugural meeting at Paris on Jan. 14, 1924, under the chairmanship of Gen. Dawes (q.v.), U.S. representative. The purpose of the Dawes Committee was to draw up a scheme of reparations and to provide for the economic recovery of Germany. The second Committee, under the chairmanship of McKenna, the Brit. representative, had the subsidiary purpose of inquiring into the value of Ger. cap. placed abroad during the 'flight from the mark.' Both Committees submitted their reports to the Reparations Commission on April 9. The finding of the McKenna Committee was that about 7 milliards of gold marks represented Ger. capital in foreign investment. The Dawes Committee drew up a detailed plan for the stabilisation of Ger. currency and a scheme of reparation payments on the basis of a two years' moratorium, followed by two years' transition, the full payment to begin in the fifth year (see DAWES PLAN). The Ger. Gov. expressed its readiness to co-operate under these conditions, and all the Allied countries with the exception of France accepted the Dawes Plan. M. Poincaré's objection that the evacuation of the Ruhr could not begin until the scheme was in operation was removed by his defeat in the May elections. M. Poincaré's retirement rendered M. Millerand's position of president untenable. On June 11 he resigned, and was succeeded by M. Gaston Doumergue, while on June 14 M. Edouard Herriot became Premier. He found it possible to co-operate closely with Mr. Ramsay MacDonald, who had succeeded Mr. Baldwin as Prime Minister of England in Jan. 1924. At the important Conference of London, which opened on July 18, Mr. MacDonald presided, and the proceedings were marked by the cordial co-operation of the U.S.A. through the Amer. representative, Mr. Frank B. Kellogg. It was agreed that America should also be represented on the Reparations Commission, thus diminishing the domination of specially Fr.

interests, and this made possible the loan to Germany proposed in the Dawes Plan. By Aug. 2 an agreement was reached which satisfied the doubts of Eng. and Amer. bankers as to Germany's security. On Aug. 9 a ministerial crisis was averted in France. M. Herriot gained the consent of the minister of war and of Marshal Foch to a military evacuation of the Ruhr within twelve months. The negotiations at the London Conference were admirably conducted by Mr. MacDonald, and on Aug. 16 the London Protocol recording acceptance of the Dawes Plan without modification was signed by all parties concerned. The plan was immediately put into operation. On Oct. 10 the Loan Agreement between Brit., Fr., Belgian, and Amer. bankers and Ger. financial delegates, providing for a loan to Germany of 800,000,000 gold marks (£40,000,000), was signed at the Bank of England. In the new year a Conference of Allied Finance Ministers was held at Paris, and an agreement was signed on Jan. 14, 1925, with regard to the div. of reparations received from Germany. In May the Reparations Commission replied to the Conference of Ambassadors that Germany was fulfilling her obligations under the Dawes Plan, and by July 31 the evacuation of the Ruhr was completed.

'Little Entente' formed—Anglo-Soviet Trade Agreement—Boundary Problems of East and Central Europe.—While the reparations problem which had been troubling E. for five years was thus for the moment being settled, affairs in Eastern E. centred during the years 1920-23 partly on Hungary and partly on the W. boundaries of Soviet Russia. The fear of Hungary, where until 1921, the possibility of a Hapsburg restoration remained, and also the lesser fear of Bulgaria, were countered by the formation of the Little Entente by treaties signed on April 23 and June 7, 1921, between Czechoslovakia, Yugoslavia, and Rumania. Rumania concluded a further defensive treaty with Poland on March 3, 1921, as Rumania could obtain no recognition from Soviet Russia for her possession of Bessarabia. Three years later, March 1924, a Russo-Rumanian Conference at Vienna failed to settle the Bessarabian question, and a Moldavian Autonomous Republic on the l. b. of the Dniester came into being on Oct. 11, thus increasing Rumanian apprehension. Rumania was one of the fifteen countries which by 1924 had not accorded a *de jure* recognition of the Soviet Gov. Preliminary negotiations between Great Britain and the U.S.S.R. had resulted in a Trade Agreement, concluded on March 16, 1921. Subsequent disputes concerned especially with anti-Brit. propaganda in the E., threatened to break this agreement, but on Feb. 1, 1924, the Brit. Gov. accorded official recognition to the Soviet Gov., and in the same year the govts. of France, the Scandinavian States, Austria, Czechoslovakia, Hungary, and Greece did likewise.

The frontier problems in Eastern E. were settled largely through the Permanent Court of International Justice,

inaugurated in Dec. 1920. There were boundary disputes and local conflicts between Germany and Lithuania over Memel; between Lithuania and Poland over Vilna; between Poland and Czechoslovakia over the Javorzina dist.; between Austria and Hungary over the Burgenland; and between Albania and Yugoslavia over the delimitation of the Albanian frontier. The boundaries of Poland were not fixed at every point until March 15, 1923, when the seizure of the Vilna dist. in 1921 by Zeligowski, an independent Polish gen., was recognised in the demarcation of the frontier by the Conference of Ambassadors. The Javorzina dist. between Czechoslovakia and Poland had been divided by a Delimitation Commission on Sept. 25, 1922, but the frontier line was not finally accepted by the Council of the League of Nations until March 12, 1924.

Although the boundary problems of Central E. and the Baltic were at length settled by negotiation, the delimitation of the Albanian frontier led to a serious political murder. On Aug. 27, 1923, Gen. Tellini, head of an It. commission, was murdered with his companions while investigating the Greco-Albanian frontier near Janina. An It. ultimatum was delivered to Greece and accepted with reservations. On Aug. 31 the It. occupied the is. of Corfu. Greece placed the It. ultimatum before the League of Nations, but at the same time was forced to submit to the Conference of Ambassadors, who demanded an inquiry into the murder of their agents. The It. action however, was condemned by the Assembly of the League, then in its Fourth Session, and the evacuation of Corfu was effected by the payment of a heavy Gk. indemnity to Italy.

Geneva Protocol—Three Power Pact on the Rhineland—Locarno Conference—Locarno Treaties—Kellogg Pact.—At the settlement of the reparations problem by the adoption of the Dawes Plan by the London Conference, the cognate questions of security and disarmament had been advisedly excluded. The problem of security remained for the Fifth Assembly of the League, Sept. 1924. The draft agreement was accepted, entitled the Geneva Protocol (g.v.), for the Pacific Settlement of International Disputes, which had already come up for consideration at the Fourth Assembly. The Geneva Protocol condemned all war save in self-defence or at the instigation of the League. The Fr. and Brit. Govs. of Herriot and MacDonald respectively had been active in sponsoring the Protocol. Great Britain was influenced by the opposition of the Dominions, and when on Oct. 8 the MacDonald Gov. was replaced by the Conservative Gov. of Stanley Baldwin, Great Britain rejected the Protocol.

The Brit. Gov. preferred a regional pact, and it remained with England to suggest an alternative to the rejected Protocol. A Three-Power Pact between Great Britain, France, and Belgium was proposed, its main purpose being to guarantee the 'present territorial status on the

Rhine.' Correspondence between Austen Chamberlain and Briand, the Fr. foreign minister, revealed that France regarded the pact as protecting the frontier from Ger. attack, while England wished to make the frontier inviolate from both Ger. and Fr. invasion. Discussions on extending the pact to include Germany were embittered by the Allied decision, communicated on Jan. 5, 1925, to postpone the evacuation of Cologne in view of the Ger. failure to carry out the disarmament clauses of the Peace Treaty. Negotiations proceeded, however, and it was at length decided to restrict the pact to the Rhineland area. Germany, despite the wishes of France, could not guarantee the permanence of her E. frontier as she had done with regard to her W. France was therefore left free to assist Poland, should there be a breach of the Ger.-Polish Arbitration Treaty. On Oct. 5, 1925, the Conference of European statesmen opened at Locarno in Switzerland. Austen Chamberlain, chairman, and Briand represented Great Britain and France respectively, while Chancellor Luther and Foreign Minister Stresemann represented Germany, and Foreign Minister Scialoja Italy, Belgium, Czechoslovakia, and Poland were also represented. The success of the Conference depended on a resolution of the difficulties which might prevent Germany's eventual admission to the League of Nations. When this was reached, the treaty of Mutual Guarantee went forward, and was hastened to a successful conclusion by Italy's decision to join with France and Great Britain in guaranteeing the Rhineland. Signor Mussolini arrived on Oct. 15. The next day the Locarno Pact was initiated by the delegates, and the date of signature was fixed for Dec. 1, to take place at London. (See LOCARNO CONFERENCE AND TREATIES). In Germany the struggle to secure parl. ratification of the Locarno Pact was successful, Ger. liberal opinion being aided by the evacuation of Cologne by the Allies in Nov. 1925. A Ger.-Rusian Commercial Treaty, designed to placate Russia's mistrust of Germany's foreign policy at Locarno, was signed on Oct. 12.

Art. 16 of the Covenant of the League of Nations, which provided for military co-operation with the League against an aggressor, was modified under the Locarno Treaties and interpreted so as to allow of Germany's entry into the League. The Assembly was convened in March 1926, to discuss the Ger. request, but Germany's admission to a permanent seat on the Council was frustrated by the similar counter-claim made by Spain, Poland, and Brazil. This affront to Germany's prestige was somewhat amended by Germany's formal admission at the Seventh Assembly in Sept. 1926; but although Poland was conciliated, Spain and Brazil threatened to withdraw, and Brazil did indeed withdraw in 1928. The other major problem which confronted the League in 1926 was that of disarmament. The Temporary Mixed Commission on Disarmament had been dissolved in 1924, and from 1926 to 1927 a Preparatory Com-

mission worked at preparing a Draft Convention. At a Preliminary Disarmament Conference held at Geneva in March 1927, the Soviet delegate, Litvinov, proposed universal disarmament, but this the other nations could not accept as limiting their sovereign powers of defence (see ARMAMENTS, LIMITATION OF). The U.S.A. were co-operating with E. over disarmament, and on April 6, 1927, Briand now foreign minister in the Poincaré gov., suggested a bilateral treaty with the U.S.A. for the renunciation of war, and the draft was submitted to America in June. On Dec. 28 Mr. Kellogg, secretary of state for America, suggested a multilateral treaty to which other states should be invited to adhere. This, however, would have annulled France's defensive alliances, and it was decided to limit the pact to aggressive wars, a ban on which had already been passed at the Eighth Assembly of the League on Sept. 24. On April 7, 1928, the Amor. draft treaty was submitted to Great Britain, Germany, Italy, and Japan. After protracted negotiations the Briand-Kellogg Pact for the outlawry of war was signed by fifteen nations at Paris on Aug. 27, 1928 (see KELLOGG PACT). Of the thirty-three states which subsequently adhered to the Pact, sixteen were European. The Kellogg Pact initiated a system of arbitration treaties, of which the first was that between France and the U.S.A., signed on Feb. 6, 1928. A similar treaty was concluded between France and the Netherlands on March 10, and between Greece and Rumania on March 12, while a treaty of Neutrality, Conciliation, and Judicial Settlement was signed between Italy and Turkey on May 30 and between Italy and Greece on Sept. 23.

In Eastern E. the peace was threatened by the dispute between Poland and Lithuania over the possession of Vilna. A technical state of war had existed since Żeligowski's *coup de main* in 1921, and was brought to a technical end in 1927 by the Conference at Geneva to which Piłsudski (*q.v.*), Marshal of Poland, and Waldemaras, Prime Minister of Lithuania, were invited by the League of Nations. No settlement, however, was reached throughout 1928, and it was feared Russia would intervene in favour of Lithuania; but on Dec. 29, 1928, Litvinov, the Soviet Foreign Commissary, proposed an Eastern Peace Pact between Poland, Rumania, Estonia, Latvia, and the U.S.S.R., and this was signed on Feb. 9, 1929. Lithuania, Persia, and Danzig adhered in April, while Finland refused. Soviet relations with Great Britain improved in 1929, when diplomatic negotiations were resumed with the Labour gov. in London. Between the U.S.S.R. and Germany a Treaty of Conciliation was signed on Jan. 24, 1929.

Reparations.—*Young Plan*—*Cancellation of Reparations*—*World Economic Depression*.—A step forward in the policy of liquidating the War, initiated at Geneva in 1928, was the formation of a Committee of Experts to make a definitive settlement of reparations. The Com-

mittee, representing seven Powers, met at Paris on Feb. 11, 1929, under the chairmanship of Owen D. Young, the Amor. representative. The report of the Young Committee was completed by June 7: it was proposed to estab. an International Bank, and reparations were fixed at 38 milliard gold marks, payable between Sept. 1929 and March 1966. The Spa percentages, settled by the Financial Agreement of Jan. 1925, were altered, and this caused some discontent with the Young Plan in England, but at the International Conference which met at The Hague on Aug. 6, 1929, Mr. Philip Snowden, representing Great Britain, secured some modification of the Young Plan in England's favour. Simultaneously, with the reparations discussions, the Political Commission at The Hague Conference, under the chairmanship of Mr. Arthur Henderson, completed and signed an agreement whereby the evacuation of the Brit., Fr., and Belgian forces from the First and Second Zones of the Rhineland should begin from Sept. 1929, and of the Fr. forces from the Third Zone immediately after the ratification of the Young Plan by the Fr. and Ger. govts. Total evacuation was completed by June 1930.

The problem of security which engrossed post-war E. is an economic one as well as military. As nations protect themselves by armics, so do they by economic barriers. Some advance, however, towards economic co-operation in E. was made by the creation of international cartels in industry. In May 1927 a World Economic Conference was held, and efforts were made at securing the removal of trade restrictions and the unification of customs nomenclature. An Economic Consultative Committee came into being in 1928 to supervise the carrying into effect of the recommendations of the Conference. The result of a Tariff Conference, opened at Geneva on Feb. 17, 1930, was a Commercial Convention, but not a tariff truce, which was signed on March 25, whereby eleven nations waived their right to denounce the various commercial treaties then existing. Customs reform in E. could be effected only by an economic reorganisation of the kind advocated by Briand on Sept. 5, 1929. His speech to the Tenth Assembly of the League of Nations endeavoured to bring the long-held pan-European ideal into the sphere of practical politics, and his proposition of a United States of E., later embodied in a memorandum to the various govts. of E., was under active discussion.

In E. in 1930-31 most other events were overshadowed by the world economic depression in general and the default of Germany in particular. Germany was practically bankrupt by 1931 and unable to continue the payment of reparations. Her efforts to conclude a customs union with Austria were frustrated through the strong opposition of France. Meanwhile in Germany the sittings of the Reichstag were suspended and a dictatorship formed under the able Dr. Heinrich Brüning as Chancellor, aided by Dr.

Luther, the banker, in an effort to restore Ger. credit and at the same time resist the progress of the National Socialists (Nazis) under Adolf Hitler (*q.v.*). The Hoover 'holiday' or respite of one year from all international debts and reparations did not save Germany from impending financial collapse and, at length, following the closing of the Reichsbank, credits were granted to Germany by the former Allied Powers. Similarly, in Austria an almost equally grave financial crisis was only partially averted by a Bank of England credit for £4,000,000.

year. Hitler, at first coming into power in coalition with Von Papen, was by the elections of March 5 made sole dictator. The Nazification of Germany then proceeded, involving persecution of the Jews, conflict with Rom. Catholicism, the withdrawal of Germany from the League of Nations and the Disarmament Conference (Oct.), and opposition to Soviet Russia which resulted in a rapprochement between that country and France. Meanwhile Mussolini launched the Four-Power Pact which, however, by the time it was initiated at Rome (June, 1933) asserted



E.N.A.

THE ALPS AND THE SOUTH: ITALY

Stresa, scene of International Conferences in 1932 and 1935, and Lake Maggiore

Finally at Lausanne, in July 1932, the whole question of reparations was settled, by the cancellation of reparations, Germany to make an eventual payment by way of bonds to the total amount of £150,000,000 at par. Elsewhere in E. the outstanding event was the fall of the Bourbon monarchy in Spain and the setting up of a republic. (See ALFONSO XIII; CATALONIA; SPAIN.) In Russia the launching of the so-called 'Five Years' Plan' to flood European markets with raw materials under cost price, contributed further to the prevailing economic depression.

Rise of Nazi Party—Mussolini's Four-Power Pact—Murder of Dollfus—Saur Rebelle.—The following year (1933) the tension continued. Economic nationalism became stronger, and the rise of Hitler's Nazi Party in Germany ruined any chance of success for the Disarmament Conference which had been sitting since the previous

no newer principle than that of co-operation within the League. In June and July in London the World Economic Conference met but ended in failure. In England the National Gov. with Ramsay MacDonald as Prime Minister, continued in office, and a departure from party gov. was noticeable throughout E. Following the Feb. riots in Paris in 1934 the veteran statesman, Gaston Doumergue, was called to office to stabilise the gov. through a national appeal, but the end of the year saw him resign; Fr. political life having been seriously impaired by disclosures of corruption and by the assassination in that year of the Foreign Minister, Barthou, together with King Alexander I. of Yugoslavia at Marseille. Barthou had previously been on a tour to strengthen Fr. relations with the Balkan states and the little Entente. Poland which, hitherto, had looked to France, was in 1934 seeking a rapprochement with Nazi Germany.

The Nazi regime had continued in Germany, although, in Austria, Nazis of German persuasion failed in their revolt which they heralded by the murder of the Austrian Chancellor, Dr. Dollfuss (July 25, 1934). Dollfuss had in February suppressed by force an armed revolt against his power from the Social Democratic Party. After his death the leadership of his Patriotic Front, into which the Right Wing parties had been merged, passed to Prince Starheimberg. Politically Austria and Italy were in agreement, and in July 1934 Hitler also paid a ceremonial visit to Mussolini in Venice. Hitler had disavowed any idea of a coalition with Austria, but he himself was confirmed in absolute power in Germany by nominating himself President of the Reich for life upon the death of President Hindenburg (Aug. 6, 1934). At the close of 1934 central European politics were centred on the forthcoming plebiscite in the Saar which was to decide the future status of that dist., and in the following year as a result of the plebiscite the dist. was returned to Germany. The forcing of a plebiscite on the people marks the first stage in the aggressive tactics of Hitler, which subsequently were to be developed into a completely matured plan for securing Ger. hegemony throughout E. The international tension in E. increased in 1935. The 'collective peace system,' goal of the ill-fated League of Nations, was proving illusory in the eyes of realists. Great Britain had tried to set an example to the world in reducing armaments, but in doing so had allowed its own armament to become inadequate, and in March the Brit. Gov. drew up a statement of its policy in the matter of imperial defence (issued as a White Paper, March 4). The increase in armaments was justified if only to enable Britain to speak with more weight in international conferences on disarmament and the rearmament of Germany, along with the spirit in which the Ger. people were being organised, was emphasised as the main cause of the feeling of insecurity in E. Hitler's reaction to the Brit. White Paper was, on March 16, without any warning, to decree the reintroduction of conscription in Germany. If from that date Britain had introduced conscription and expanded her Air Force to the utmost, there would have been no world war four and a half years later. But none in England dreamed of the rate of Ger. rearmament or the predatory character of Nazi policy—with the exception of Mr. Winston Churchill, whose voice was more or less unheeded in a world which was still war-weary from the exertions of the First World War. Instead, efforts were made to pursue the futile policy of trying to bring Germany back to the councils and comity of E. on terms which would be just to her and fair and secure for all. Sir John Simon, foreign secretary, went to Berlin only to find confirmation of the worst suspicions which were held in England with regard to Germany. Hitler would have nothing to do with a proposed E. Pact of mutual guarantees, had no interest in the 'col-

lective system' of peace and security, refused to withdraw the conscription decree, would give no guarantees with regard to Austria, and vaunted his achievement of parity with Great Britain in the air.

Stresa Conference.—In April a conference was held at Stresa between Brit., Fr., and It. representatives to consider the relations of their three countries to Germany. Prior to the conference the 'isolationist' group in the Brit. cabinet made it clear that Great Britain would on no account undertake any new international commitment. In spite of continued Ger. provocation, the three govts. represented at Stresa recorded their anxiety to join in every practicable effort to promote international agreement on limitation of armaments, Germany being invited to be a partner to negotiations. Mr. Ramsay MacDonald, Brit. Prime Minister and representative at Stresa, subsequently charged Germany with having acted so as to destroy the feeling of mutual confidence in E. and with 'breaking up the road to peace and besetting it with terrors' (article in the *News Letter*). Later in the year Mr. Eden, foreign secretary, defined Britain's attitude to Germany as one of 'practical and comprehending realism,' but he still emphasised the need for a system of collective security to be built up through the League. It was, however, beginning to be clear—especially since the conclusion of an Anglo-German naval agreement allowing Germany to build a navy up to 35 per cent of the Brit. strength—that few Brit. ministers and still fewer Fr., desired to go very far in defence of the shadowy principle of collective security. This principle received a rude shock in the course of the strenuous efforts made by the Brit. and Fr. govts. to prevent Italy from invading Abyssinia, and it may be said that the collapse of the policy of applying economic sanctions to Italy, after the opening of the It. invasion, sealed the doom of the League as a force in the sphere of power politics. There can be but little doubt that Brit. policy towards Italy—although modified by the eleventh-hour effort of the Hoare-Laval Pact—embittered relations between Britain and Italy to a degree which was to have serious reactions in the World War of 1939-45 (see also *ABYSSINIA*).

Italian Invasion of Abyssinia—Spanish Civil War.—The succeeding year was dominated, as to the earlier months, by European reactions to the Italo-Abyssinian campaign and, as to the later months, by the outbreak of civil war in Spain. In both cases France took the lead in the effort to resolve the issue through the League machinery of collective action. Both events were of immediate and obvious significance to France and a source of eventual anxiety to Britain by reason of the manifest interest of Italy in the Mediterranean and the possibility that Mussolini and Hitler would exploit the situation in Spain to poison Anglo-Sp. relations. There can be no doubt that Italy felt the sting of the economic sanc-

tions which, however, were powerless to stop their rapid conquest of Abyssinia soon after Gen. Badoglio (*q.v.*) took control of operations and exploited the technique of combined air and motorised-artillery tactics. Yet the sanctions were not lifted until July 15 or over two months after the It. forces had seized Addis Ababa. In the Sp. Civil war (*q.v.*) Britain and France—which two nations all through these troubled years prior to the Second World War acted in close co-operation from the identity of their outlook and national interests—followed a policy of what was called 'non-intervention.' This policy was, naturally, condemned by Communist sympathisers with the Sp. Republican Gov. as tantamount to 'keeping the ring' clear for Gen. Franco's rebels, who were further helped to victory by material assistance in men, planes, and guns by both Mussolini and Hitler. This assistance was to seal the doom of the Republican forces which, however, inflicted a resounding defeat on the It. forces on the Guadalupe. The ostensible interest of Mussolini and Hitler in Spain was the fulfilment of their common anti-communistic ideology as expressed in the anti-Comintern Pact (*q.v.*). Actually their aims were essentially imperialist and indicative of an unceasing joint policy of exploiting every disturbed situation in E. which might serve the purpose of enhancing their power as against Britain and France. Mussolini, however, was in the invidious position of being in effect the satellite of Hitler; for while his Mediterranean ambitions received at least sympathetic consideration by Britain, they were luring him along the path which was calculated to drift his country into a general European conflagration against the Western Democracies with no kind of guarantee that Germany would respect It. aspirations any longer than suited Germany's goal of *Weltmacht*. Elsewhere in E., a notable event of this year was a visit by King Edward VIII. to Istanbul. This visit was the sequel to the successful application by Turkey to regularise the Dardanelles; and the grant of this and other Turkish demands cemented the good relations between Turkey and Britain, which were destined to have some effect on the war three years later. At the opening of the year 1937 the situation in Spain was still fraught with the potentialities of a European conflict, despite all the efforts of France and Britain to support the policy of non-intervention. The answers of Germany and Italy to the Franco-Brit. proposals for banning volunteers to Spain was still not forthcoming nor was satisfaction ever given on that count throughout the Civil war. There was a definite improvement, however, in the international situation through the Italo-Brit. negotiations for regulating the position in the Mediterranean where, for some time, there had been serious possibilities of friction between the two countries. In March King Leopold of Belgium visited England to discuss the more effective safeguarding of Belgian

neutrality. Later, a Franco-Brit. declaration was issued relieving Belgium from her obligations under the Locarno Treaties (*q.v.*), while continuing in force the Franco-Brit. guarantees of her integrity. Events three years later were to show that it would have been far wiser had all three countries restored as far as possible the famous 'scrap of paper' or Treaty of 1939, and then promoted staff talks for their mutual defence; for in the development of Hitler's plans, the neutrality of no nation was respected and one after another was fated to be but the stepping stone to the destruction of the Brit. Empire. In the Sp. Civil war there were always incidents to point the moral of Ger. methods of warfare and diplomacy, yet such was the faith in 'collective action' and the lure of 'appeasement' that these things passed without more than indignant comment. On May 30, the Sp. Gov. aeroplanes dropped bombs on the Ger. battleship *Deutschland* in the harbour of Isvizia. Ger. warships immediately bombarded the open port of Almorá, and the Ger. Gov. then announced its withdrawal from the work of the non-intervention committee. It should have been apparent to any European statesman that the Ger. Gov. had no intention of observing any international obligations whatsoever but only to make a show of respecting such obligations for so long as it might suit the purposes of her dictator and his entourage. The destruction, too, of the Basque tn. of Guernica by Ger. bombs from the air towards the end of April aroused intense horror throughout the world; but the Brit. Gov. seemed less concerned to express its undoubted moral indignation than to keep alive the futile activities of the non-intervention committee. All this year Germany was putting forward insistent demands for colonial possessions. This question was discussed by the Fr. and Brit. Govs. towards the close of the year, but it was recognised that it was not a question that could be considered in isolation or without consulting other colonial powers. (See COLONIAL QUESTION, THE). The Sp. Civil war dragged on throughout 1938.

British Foreign Policy of 'Appeasement'—Hitler seizes Austria.—The Brit. Gov. was united in its determination to keep the non-intervention committee in being; but while Mr. Eden, foreign secretary, took the view that the immediate task of the committee was to secure the withdrawal of It. and Ger. forces from Spain and that only by success in that effort could its continued existence be justified, the Prime Minister's (Mr. Chamberlain) chief anxiety was to keep on good terms with Mussolini, and to ensure that one had no objection to the It. and Ger. troops remaining in Spain until their activities should bring about Franco's victory. This difference in outlook between the two ministers led to inconsistencies in Brit. foreign policy and was soon to lead to an open breach between them fraught with startling consequences not merely for the political situation in Britain itself but in E. as a

whole. In the midst of these pre-occupations over Spain, Hitler summoned the Austrian Chancellor, Dr. Schuschnigg, to Berchtesgaden and ordered him to remodel the Austrian Gov. in conformity with Nazi ideas. Mr. Eden's suspicions of the Ger. and It. dictators now brought him into complete disagreement with Mr. Chamberlain over the question of opening negotiations with Italy on all outstanding issues, Mr. Eden insisting that Italy's tone was menacing and that before negotiations were begun Italy should fulfil her pledge to withdraw her troops from Spain. In this attitude the foreign secretary had the sympathy of the opposition members of the Brit. House of Commons, but his partisans were won over to the majority and he resigned. He explained his resignation on the broad ground that the dictators had repeatedly violated international agreements and constantly attempted to secure political decisions by forcible means. That his attitude was justified found confirmation in the fact that when the European War broke out in 1939 he was re-appointed to the gov. by Mr. Chamberlain, along with Mr. Winston Churchill and later with Mr. Duff Cooper—all these statesmen being outspoken and fearless critics of dictatorial policy in Europe and opposed to Mr. Chamberlain's policy of 'appeasement,' a policy which, in the light of future developments, was to be fraught with the gravest possible danger to the peace of E. and the liberties of all nations. Germany was now disregarding her pledged word in regard to Austria in the same way that Italy ignored hers in the matter of Spain. Germany was proposing to hold a 'plebiscite' in Austria on the question of that country's absorption in the Reich. Lord Halifax, now Brit. foreign secretary, protested to the Ger. Gov. on this virtual ultimatum to Austria, but Baron von Neurath, Ger. foreign minister, retorted in very plain language that Austria was no concern of Britain's. Hitler now brought off his second coup—the seizure of Austria by an unresisted invasion and the conversion of that republic into a prov. of the Reich. (See AUSTRIA.) By the late summer, however, Mr. Chamberlain was expressing the view that the prospects of peace being maintained in E. were somewhat improved. His optimism was founded on a scheme evolved by the non-intervention committee for removing foreign troops from Spain and in the mission of Lord Runciman to Prague to mediate between Czechoslovakia and the Sudeten Gers.

The Munich Pact—German seizure of Czechoslovakia—German invasion of Poland.—Hitler had long planned to be ready for war in Aug.-Sept. 1938 and by way of *casus belli* he incited the Ger. minority in the Sudetenland of Czechoslovakia to demand incorporation in the Reich. It was obvious that the loss of the Sudetenland would leave Czechoslovakia defenceless. Both France and Russia were bound by treaty to defend the Czechs, and Britain, though not a guarantor of the integrity of Czecho-

slovakia, could be expected to follow France. But when the crisis came, neither France nor Britain was adequately equipped for war, both having allowed Germany to mass produce armaments without attempting to stop her or to take countermeasures, and even when Britain began in 1937 to make preparations for mass production of munitions they were half-hearted; and France was in worse case, for in the years of Germany's rearmament her attention was largely occupied with internal economic dissensions, particularly with the 40-hour week suddenly imposed by statute on industries accustomed to a 52-hour week (or even more)—Germany's was then a 60-hour week. It was in these circumstances that Great Britain and France yielded to Hitler and concluded the notorious Munich Pact (q.v.) on Sept. 29, 1938, which has been described as 'one of the great capitulations of history.' During the negotiations Hitler brazenly raised his terms and the two humiliated Powers accepted them all—at the expense of Czechoslovakia. The Pact gave no protection against further seizure of territory save a worthless promise from the signatories (Germany, Great Britain, France, and Italy). Russia, though the ally of France, had not been invited to the Munich Conference and five months later the Soviet Gov. announced that Russia considered herself released from any obligation to Britain or France. Hitler had gained enormously on balance—the elaborate fortifications of the Bohemian frontier and the well-equipped Czech army, the great factories of Pilsen and Brno all fell to him in the sequel without his firing a shot. Britain and France had gained nothing, for even the twelve months' grace for rearming was but illusory and at the end of the time Germany's superiority in armament was even greater than before Munich. At Munich Hitler had averred that he wished for nothing more than the German-speaking areas of Czechoslovakia but very soon his armies overran the Czech areas as well. Britain and France, despite Munich promises, protested but did not attempt to resist Hitler (for full details of the diplomatic events leading to the German invasion of Czechoslovakia and the circumstances of the invasion, see under CZECHOSLOVAKIA). Hitler, thus encouraged, proceeded to seize Memel (q.v.) while Ger. troops were sent into Slovakia, which had been declared independent (see SLOVAKIA) in order to outflank Poland. It was in these circumstances that Great Britain on March 24, 1939, gave a unilateral guarantee to Poland which already (like Czechoslovakia) was in alliance with France. Hitler then made demands on Poland for the incorporation of Danzig in the Reich and other demands which if granted would have disrupted Poland much as the annexation of the Sudetenland had disrupted Czechoslovakia. The Polish Gov. refused the demands and Hitler on April 28 annulled the German-Polish pact of Non-Aggression. By July his troops were entering

Danzig. As the political horizon darkened the Brit. Gov. became more active at home and abroad. A ministry of supply was formed (April 1939) and unilateral guarantees given to Rumania and Greece and a treaty for mutual assistance signed with Turkey. These guarantees, however, were of small practical value without the support of Russia. Britain sought Russian co-operation but could obtain it only at the price of acquiescence in Stalin's occupation of the three Baltic states. Hence Stalin conducted parallel negotiations with Hitler and on Aug. 23, 1939, the world was amazed by the news of a Ger.-Russian pact (*see below* *Hitler's 'Volte-face'* with Stalin). The pub. text of this Pact recorded a close agreement between the two Powers, adding that if either were attacked by a third, the other would give no help to the attacking Power. No-one could doubt, however, that more specific bargains were covered by secret clauses, and events soon showed that these concerned the betrayal of the Baltic states, the partition of Poland and forced concessions from Finland. All was now in train for Hitler to launch his thunderbolts of war and after a farce of ultimatums, which Poland was given no opportunity to answer, the Ger. armies invaded Poland (for full details of the causes of the Second World War and of all immediately antecedent events, *see* *WORLD WAR, SECOND, Causes*).

HISTORY OF EUROPE DURING THE SECOND WORLD WAR (1939-45).—*German Conquest of Poland—Position of Neutral Countries.*—The hist. of E. in the first two years of the war was the record of the rapid and shattering Ger. conquest of one European country after another, until Britain remained the sole defender of the liberties of mankind against a triumphant Germany holding down most of the Continent, including her fascist partner, Italy, whose unhappy people had been dragged into the war by Mussolini in the expectation of cheap and easy rewards. For the greater part of this period Stalin played the rôle of European Janus, always apparently ready to enter into formal agreements with Hitler, yet never losing an opportunity of strengthening his frontiers against him.

Poland, with her somewhat medieval army, proved unable to stem the tide of invasion even for the short period which many military experts thought probable. The attack proceeded at immense speed, with a devastating avalanche of mechanised troops supported by an overwhelming force of dive-bombers and fighter planes. Civilians were mercilessly bombarded from the air. To paralysed traffic the Ger. bombers flew alternately up and down the backs of streets knocking the houses down towards each other. By the middle of Sept. Warsaw was surrounded and the Polish armies fell back on their last line of defence to the east. (*See* *POLISH CAMPAIGN IN SECOND WORLD WAR*.) At this point the Soviet army crossed the frontier in their rear and Polish resistance collapsed (Sept. 24). Once again in its chequered story Poland was partitioned,

with provision for a small puppet state under Ger. domination. It seems evident that the assignment of a part of the country to Russia was part of a bargain made between Germany and the Soviet immediately before the invasion began and with the object, on Germany's part, of avoiding the contingency of a war on two fronts. In the West of E. the Allied declaration of war was followed by a long lull—excepting at sea (*see* *NAVAL OPERATIONS IN SECOND WORLD WAR*). On land the Maginot and Siegfried Lines were promptly manned, but both were either too strong for a major attack with the advance of winter or, more probably, the Fr. armies preferred to remain strictly on the defensive, while the Ger. High Command had, from the first, the strategy of the Schlieffen plan (*q.v.*) in mind—to outflank the W. Front by an attack through the Low Countries at such time as they were ready. On Sept. 11 a Brit. Expeditionary Force of eight divs. under Gen. Lord Gort had crossed the Channel and taken its place beside the Fr. armies, under the supreme command of Gen. Gamelin (*q.v.*). Not long afterwards there was more than a hint that the area of conflict would be extended. Even at this early time, a Ger. invasion of the Low Countries in order to turn the flank of the Allied position and establish bases for air attack against Britain seemed to be seriously threatened; but the Ger. staff evidently thought better of the plan for the time being. Russia took the opportunity to reduce the three small Baltic republics to vassalage, this being presumably part of the price paid by the Reich for the Russian 'entente.' Soon afterwards Russia invaded Finland—the obvious purpose of this unprovoked onslaught being to secure her Baltic position against Ger. encroachments. (*See* *FINLAND—History*.)

Up to the end of the spring of 1940 there were no major military developments on the W. Front. The belligerents were mainly engaged in manoeuvring for position. The diplomatic omens for the Allies were dark. The devastating completeness of the success of Germany's Polish campaign not only freed Germany of the nightmare of a war on two fronts, but it demonstrated, even more obviously than the fate of Czechoslovakia (*q.v.*), the reprisals small states, however 'guaranteed,' might expect at Germany's hands if they were spirited enough to offer resistance to her plans of European conquest. In the first six months of the war, the struggle between Germany and the Allies had been to secure the support of the neutrals, and especially of the N. neutrals. The Allies had espoused Finland's cause, but, since Finland had been defeated, their prestige had suffered a heavy blow. However exorbitant might be Ger. demands on neutrals, they were not unlikely to be conceded, owing to the prestige of terror excited by Germany's victories; but Ger. demands were not always so evidently exorbitant as to drive neutrals in desperation to seek aid elsewhere. Often they took the form of

pressure to secure advantageous trade agreements ensuring the supply of essential raw materials. The neutrals, however, were a far greater problem to the Allies, for, by remaining neutral and trading with Germany—even under compulsion—they considerably diminished the efficacy of the Allied blockade. It was, therefore, the cardinal problem of the Allies to try to convince the neutral world that they were fighting the battle of every small state and that they were sufficiently powerful and determined to achieve ultimate victory. With the defeat of Poland and Finland, the policy of the smaller European neutrals was that, at whatever sacrifice of economic and political independence, they must not become involved in the war. Yet, in reality, had Norway and Sweden consented to the passage of a large Anglo-French force through their ter., Finland might have been saved from Russia's invasion, though, as events were to show, it was to the Allies' advantage not to thwart or weaken Russia but to make her as strong as possible in relation to Germany. Since, too, the Allies were negotiating a full alliance with Russia in August, 1939, their failure to achieve it was a severe diplomatic setback, however forcibly events in Poland and Finland were to illustrate the price they would have had to pay. Germany was able to make use of her general advantage *vis-à-vis* any neutral state in E. The Allies had to ask Russia to fight and to ask in vain; Germany only that she should remain neutral. After Poland's partitioning, Germany and Russia appeared to be collaborating in harmony. Their govs. by Dec. 1939, had begun the transfer of Gers. from the Polish provs. annexed by Russia and of Ukrainians and White Russians on the Ger. side of the partition line, the numbers involved being respectively 100,000 and 1,000,000.

German designs on 'the Low Countries and Scandinavia.—In Nov., Ger. troop concentrations on the border caused alarm in Holland. King Leopold, who on Oct. 27 had announced that Belgium would fight if attacked, suddenly visited Queen Wilhelmina (Nov. 7), and the two rulers broadcast a joint offer of mediation to the belligerents, which was of course rejected. The development of the Polish crisis found the Iberian peninsula divided. But despite Ger. propaganda, Portugal remained pro-Ally and stood by her ancient alliance with Britain. In Spain, the Franco Gov., in recognition of aid in the Civil war, inclined to the Ger. side, while the conquered republicans held aloof in resentment of the failure of Britain and France to assist them in that struggle. But undoubtedly Gen. Franco was apprehensive of the abrupt change of front by the Gers. towards hapless Poland, though little sympathy was expressed in Spain for Catholic Poland. On Oct. 19 was signed an Anglo-Fr. treaty of assistance with Turkey, which contained a proviso absolving Turkey from compulsion to take action which would involve her in war with Russia. Italy declared her 'non-

belligerency' at the outset of the war. Signs of Russian interest in the Balkans aroused alarm in Italy, and the relations of that country with Turkey and Greece improved on that account. But as time wore on it became evident that a common Balkan pact was as far off as ever, and, as will be seen later, Turkey ultimately found herself isolated when the whole of the rest of the Balkans had surrendered to the Ger. forces in 1941.

In the early months of the war it was seen that Germany was evading the Brit. blockade by transporting iron-ore from the Kiruna mines in N. Sweden through the territorial waters of Norway and these waters were accordingly mined by the Royal Navy. But Germany had much wider designs on Scandinavia, and was planning to seize Norway so as to be able to threaten the Brit. coasts from Norwegian ports. Suddenly, in April 1940, Ger. forces seized a number of key points in Denmark and Norway, including both Copenhagen and Oslo. Denmark was powerless to resist, but its only outlying dependency, Iceland, was saved by being taken under the immediate protection of Gt. Britain. The Norwegians offered a heroic resistance under King Haakon and a Brit. expedition was hurriedly landed in Norway. But the Ger. surprise invasion was complete and their forces, landed by parachute and in troop-carrying planes, soon put them in possession of the few existing airfields. Norwegian resistance soon became hopeless, the more so as their capital had been betrayed by one Maj. Quisling (*q.v.*), whose name became a synonym for this kind of treachery (*see also FIFTH COLUMN*); the King went to England and the Brit. force was re-embarked for Britain (*see NORWAY AND DENMARK, GERMAN INVASION OF (1940)*). This Allied defeat produced immediate repercussions in Britain and France, Mr. Churchill replacing Mr. Neville Chamberlain as Prime Minister of Britain, and Paul Reynaud replacing Daladier, both being pledged to the more vigorous prosecution of the war, while some impetus was given to the movement for a closer understanding between the Brit. and Fr. govs. through the Supreme War Council.

German Conquest of Belgium and Holland—Collapse of France—Franco-German Armistice—Vichy France breaks off relations with Britain—Italy declares war.—Hitherto the Low Countries had absolutely declined any consultation with the W. Allies, on whose help they would necessarily have to rely for their defence. Their neutrality, however, was soon destined to suffer a shattering disillusionment. Without notice or declaration of war, the full fury of the Ger. war-machine was unleashed against both Holland and Belgium, with the object of forcing a way through their ters. and turning the left flank of the Maginot Line (May 10). Holland was crushed in a few days, and King Leopold surrendered on May 28. The Dutch royal family escaped to England. The greatest rearguard action that military hist. has ever recorded culminated in the evacuation from Dunkirk, when

335,000 men of the R.E.F. were brought home. Gamelin's whole strategic plan collapsed. The Gers. entered Paris on June 14. (For the immediate effect on Britain of the collapse of the Western Front and the preparations made for the defence of Great Britain against a Ger. invasion, see GREAT BRITAIN: *History*.) Reynaud, who seemed prepared to carry on the fight in Fr. ter. overseas, found himself in a minority of one in his own Cabinet, and a new cabinet was formed under Pétain, which in 1941 had become

tection of her Mediterranean interests, was now in danger of being handed over to Germany. But this menacing situation was generally changed for the better by Mr. Churchill's prompt exercise of Brit. sea-power against the Fr. fleets in Oran and Mers-el-Kebir, a number of ships being sunk or put out of action (see NAVAL OPERATIONS IN SECOND WORLD WAR). The immediate result of this move was that the Fr. Gov., now at Vichy, broke off diplomatic relations with Britain. It has sometimes been supposed



Imperial War Museum: Crown copyright
1940: THE DUNKIRK EVACUATION

so permeated by Ger. sympathisers that the two countries thenceforth openly collaborated against Britain. France signed an armistice with Germany on June 22 and with Italy, which country had entered the war on June 11 in the hope of securing the spoils of victory at the least cost to herself in blood and treasure, on June 24. (For the campaign on the W. Front, see WESTERN FRONT IN SECOND WORLD WAR and for the immediate and underlying causes of the collapse of France, see below and FRANCE: *History*.) The collapse of France in conjunction with the entry of Italy into the war created a situation of grave peril for Britain and not least in the Mediterranean where the Brit. forces were now heavily outnumbered by land and by sea. The Fr. Fleet, on which much reliance had been placed by Britain for the pro-

tection of her Mediterranean interests, was now in danger of being handed over to Germany. But this menacing situation was generally changed for the better by Mr. Churchill's prompt exercise of Brit. sea-power against the Fr. fleets in Oran and Mers-el-Kebir, a number of ships being sunk or put out of action (see NAVAL OPERATIONS IN SECOND WORLD WAR). The immediate result of this move was that the Fr. Gov., now at Vichy, broke off diplomatic relations with Britain. It has sometimes been supposed that Mr. Churchill was too precipitate in his action towards the Fr. fleet; but nothing in the hist. of the men, like Laval, Adm. Darlan, and Bonnet, who were now controlling Fr. destinies under the aegis of the helpless and aged, if honourable, Marshal Pétain, would lead the dispassionate historian to suppose that any other course would have been prudent. France was defeated, crushed and humiliated and not least by her own wealthy bourgeoisie and fifth columnists (see FIFTH COLUMN). Resistance from Algiers, with the aid of the Fleet, might have been practicable, but such resistance would have been rendered abortive by political machinations and by Ger. pressure on the families of the Fr. naval officers and men.

German infiltration in the Balkans and Hungary—Tripartite Pact.—In the E.

Mediterranean a large It. army under Marshal Graziani, based on Libya, was preparing to invade Egypt, whose protecting forces were embarrassed by the situation in Syria in its rear. But instead of advancing rapidly across the W. Desert, Graziani proceeded in leisurely manner to organize powerful defences in Cyrenaica, while new armies suddenly advanced on Albania to invade Greece. Whether this adventure was embarked on with the knowledge or connivance of Hitler seems doubtful. It is more probable that Italy was suspicious of Ger. infiltration through Rumania into the Balkans generally and sought herself to acquire control of the E. Mediterranean by antipating the Gers. But by the end of the year the entire It. Colonial Empire was in jeopardy through the military and naval successes of Brit. and Gk. arms (see AFRICA, NORTH, SECOND WORLD WAR CAMPAIGNS IN; GREECE, SECOND WORLD WAR CAMPAIGNS IN (1941); and ITALIAN EAST AFRICA, SECOND WORLD WAR CAMPAIGN IN (1941)).

For the time being, Greece, aided by Brit. naval, military, and air forces, was still heroically resisting the invader, and indeed, had Germany not taken a hand, would have driven the Its. out of Albania. But meanwhile, the Ger. war machine, gradually and remorselessly, was shaping European economy to its own exclusive needs, and among its next victims were the S.E. states of Hungary and Rumania. Hungary was admitted to the Axis (*q.v.*) but only when her superiors decided that her interests were involved. Rumania, by a succession of gradual encroachments on her sovereignty, soon found her entire system of gov. subverted. The Soviet was won over to these Nazi absorptions, by the cession of Rumanian ter., but Turkey, though dangerously situated between the Ger. hammer and the Russian anvil, reiterated its continued friendship with Great Britain and its determination to defend its independence. At the other end of the Mediterranean, Gen. Franco pursued an opportunist policy, which, when France fell, seemed not unlikely to bring him into the war as a partner in the Axis; but he became cautious when it was seen, in the autumn (1940), that the destruction of Brit. power was still far off. Meanwhile, despite Ger. military successes, the hope of the oppressed nations of E. was reposed in Britain, who was in the way of obtaining material aid from the U.S.A., whose President, earlier in the year, had sent Mr. Sumner Welles to tour the belligerent countries of E. in order to acquire information on the general position (see Sumner Welles, *The Time for Decision*, 1944). The menace of 'Hitlerism' to the New World, made obvious by the Tripartite Pact between Germany, Italy, and Japan, drew closer the bonds of sympathy between the U.S.A. and Great Britain. (See EARLIS, PACT OF.)

During the first five months of 1940, the Balkan States, including Turkey, were the scene of much diplomatic competition between the W. Allies, the Axis, and Russia. The Allies sought economic

advantages and the denial of Balkan raw materials, especially Rumanian oil, to Germany, through purchases of local supplies and their support of Balkan unity—both of which means proved abortive. Stalin, seizing his advantage from the Fr. collapse, delivered an ultimatum to Rumania, which, being unable to resist except through the doubtful medium of Hitler, ceded Bessarabia and N. Bukovina to Russia whose confines now reach the Lower Danube. A pro-German puppet gov. in Rumania repudiated the Anglo-Fr. guarantee and withdrew Rumania's membership of the League of Nations. Thus the Balkan Entente was at an end. Now, both Bulgaria and Hungary, undermined by Nazi sympathisers, pressed territorial demands on Rumania. With Ger. aid, Bulgaria obtained the S. Dobrudja. Britain acquiesced in the vain hope of buying off Bulgarian sympathy for the Axis. Hungary and Rumania could not agree and, on Aug. 30, lt. ministers at a conference in Vienna, dictated a settlement which cost Rumania over half of Transylvania. This betrayal resulted in the abdication of King Carol (Sept. 6) and the entry of Ger. troops. Rumania, for all practical purposes, was now a Ger. protectorate.

Nazi persecutions in occupied countries.—Under Ger. occupation, Poland, Czechoslovakia, Belgium, Holland, and France suffered privations and hardships in varying degree. Throughout 1940–41 there was no respite from Ger. terrorism in Poland. Every day brought new examples of inhuman cruelties and shootings on the slightest pretext. The unmasked plot of the Gestapo (*q.v.*), the Ger. terrorists, was nothing less than the extermination of the Polish pop. in the eastern areas of E. The Ger. 'Youth Organisation' was reviving in all its horrors the traditions of the anct. Teutonic knights, who, under the pretext of converting the heathens to Christianity, conducted in the Middle Ages in E. Prussia, Pomerania and Lithuania the most ruthless extermination policy. In Holland, economic life was subordinated exclusively to Germany's interest. The Dutch had to bear the costs of the occupation and also those of all Ger. preparations for an attack on Great Britain from Dutch shores, where one million Ger. soldiers were concentrated. A special branch of the Ger. Chamber of Commerce for the Netherlands was estab. to provide for raw materials to Dutch industries so as to ease the pressure on Ger. industries. Similar conditions prevailed in Czechoslovakia and in Belgium, where economic life was ordered exclusively in the interests of the Ger. war-machine. In the first months of the occupation the Gers., mindful of the influence in the last war of Cardinal Mercier, were careful not to do anything that might offend the Church. The two prin. obstacles they encountered in Belgium were, as before, the spiritual and the communal power. These still represented the soul of Belgium. Hence, in 1941, the Ger. propaganda machine began to make

unfounded attacks on the Belgian clergy. Germany did not hesitate to plunder Belgium of its reserves of food, though the country has never produced enough food for domestic consumption. In exchange the Gers. paid in marks of the Reichskreditkassa, which were worthless outside the occupied territories and therefore could not be used to replenish supplies. From the start rationing was very severe and was indeed a prin. cause of the moral resistance which began to assert itself in Belgium soon after the occupation began. The situation was even worse in Holland, where the Gers. tried to prevent the smuggling of Dutch foodstuffs across the frontier. Elsewhere in E., the burden of oppression lay heavily on the nations. Bohemia was in the grip of famine. In large Czech areas the distribution of meat was negligible. Famine conditions were created by wholesale Ger. requisitioning, by congestion of communications with military material and by heavy Ger. immigration into Czechoslovakia. In Norway, after the Lofoten raid (see NAVAL OPERATIONS IN SECOND WORLD WAR) and the destruction of the machinery for extracting glycerine oil, a large quantity of fish was thrown upon the market and fish suddenly became plentiful again in N. Norway. But the people were then presented by Germany with a bill for 200 million kroner on account of the Ger. occupation and this was only an instalment.

In the summer of 1940 the Gov.-General of Ger. occupied Poland was incorporated in the Reich as a puppet state, Hitler having realised that he could no longer use an 'independent' puppet Poland as a bribe to Britain to make peace. The immediate result of this change was a lull in persecution, especially as the Gers. were fully occupied elsewhere in E. Exiled Poles were even induced to return, but those who did were set to work in slave-gangs to work on fortifications, roads and quarries, and never saw their homes. There had been a scheme to force all Jews into Lublin, but the first deportations caused so serious a threat of general starvation that in June 1940 the Ger. governor himself was driven to protest. There were widespread deportations of Poles from Poznan, Pomerania, and Silesia into the Gov.-General so that good agric. land should be put at the disposal of the Ger. 'ruling people' (Herrenvolk). In Russian-occupied Poland there was little terrorism until the end of 1940, but thereafter began deportations into Central Russia, Turkestan, and Siberia. But with the single exception of the Poles, no nation in modern times has endured so devastating a persecution as was inflicted by Germany on the Czechs during the two years since their 'bloodless conquest' of March, 1939 (the facts may be studied in *Two Years of German Oppression in Czechoslovakia*, pub. in 1941 by the Czech Ministry of Foreign Affairs). Tens of thousands of prisoners passed through the Gestapo centre in Prague to be robbed of their possessions, humiliated and killed or half killed either at the centre or in

concentration camps. Particular objects of Ger. vengeance were officers who had served with distinction in the Czech army. Their treatment throws much light on Ger. conceptions of 'chivalry' towards the vanquished. Czech culture in all forms was an especial object of Ger. animosity and persecution. All univs. and colleges were soon closed. The churches fared no better; their property was confiscated and many priests were sent to concentration camps (q.v.).

German occupation of Bulgaria—Abovite Serbian revolt.—We have seen above how the Balkan Entente came to an end. After the Ger. absorption, King Boris (q.v.) still hoped at least to keep his country neutral. Pro-Brit. himself, and his people pro-Russian, his belief that he could keep Bulgaria out of the struggle probably rested on his faith in the influence of Russia as the traditional protector of the Balkans and on an equal measure of confidence in Britain's growing strength. But his army was pro-Ger. and it had the backing of many politicians. Thus it came about that the infiltration of German 'tourists' and a disguised occupation of key-points by Ger. technicians were permitted right from the beginning of the war, while Russia, though jealous of this Ger. penetration in her sphere of racial influence, was impotent against it.

Throughout these months diplomatic battles raged between the small states in the Balkans and Germany's vast and menacing power—the bloodless prelude to the imminent war which was to be fought. In the hope of forestalling the Ger. invasion of Greece, Mr. Eden, Brit. foreign secretary, visited the Balkans in an endeavour to organise a Balkan bloc of resistance. To counteract this visit and the effect of the American Lend-Lease Bill, the Ger. Gov. hastily occupied Bulgaria, 'invited' Yugoslavia to join the Axis and gave 'friendly' advice to Greece to conclude peace with Italy. From the previous year Turkey was one of the most active advocates of a Balkan union. Its diplomacy made continuous efforts to consolidate the community of the Balkans as well as the rule, theoretically accepted but not applied everywhere, 'the Balkans for the Balkan people.' But Turkish policy followed three other main lines, which were rendered difficult by the proximity of Ger. forces: not to fight against Great Britain; not to help Germany; and to do nothing of which Russia would disapprove. For Russia gave no assurance that, if there were war in Thrace or in Asia Minor, she would not seek some strategic gain in Iran or elsewhere and, as experience had shown in Poland, Scandinavia, and Rumania, Russia had always taken compensation for her acquiescence in Ger. aggression. Yugoslavia embarked on a temporising policy. Ever since the murder of King Alexander the country had been under a regency. There were jealousies within the young kingdom which seriously impeded its political and economic development. When the Prime Minister, M.

Tsvetkovitch and his associates went to Vienna at Hitler's request to sign away their country's independence, the Serbs rose in revolt. Prince Paul, the regent, fled and the country prepared for war. But the Serb coup d'état and the people's traditional bravery were of no avail, and the country was overrun by Ger. troops in a few days (see p. 487, *Surrender of the Greek Army and under GREECE, SECOND WORLD WAR CAMPAIGN (1941)*).

Franco-German Collaboration—The German 'New Order.'—It has been indicated above that, after the Brit. fleet attacked the Fr. ships at Oran and Mers-el-Kebir, diplomatic relations between France and Britain were broken off. This rupture of diplomatic relations that could have had little more than a conventional basis, was hardly more than a gesture in self-defence. France had been crushed and humiliated in the field, and any overt sympathy for her former ally, Britain, might well have resulted in the termination of the Armistice and a Ger. occupation of that part of France which remained, at least nominally, under the control of the Vichy Gov. The transition from an uneasy passivity towards Britain to open hostility was only gradual. The Brit. Gov. for months was weak and complaisant towards Vichy and hesitant in its support of the Free Fr. followers of Gen. de Gaulle (*q.v.*). It long retained an implicit trust in the aged Marshal Pétain (*q.v.*) himself a vacillating and impotent force in Fr. public life. This attitude sprang from Britain's inability to believe that any Fr. leader could see in the Ger. invader anything but a traditionally hated enemy, and that, at heart, all France merely awaited the day of resurrection. And, truly, after the triumph of the Brit. defence in the Battle of Britain (*see* **BRITAIN, BATTLE OF**) from Aug.-Oct., 1940, many Frenchmen entertained this hope—a natural hope inherent in the normal and honourable interpretation of Fr. interests and security which associated the fate of France with the free civilization of the W. But a true understanding of some of the fundamental causes of the defeat of France pointed inevitably to a diametrically opposed conception of the interests and security of France—an acceptance by fearful and miserly men of the position that E. must inevitably be unified by Germany and that the hope of France lay in conciliating the old enemy and in fitting her economy into the needs of the Reich. The men of property, the bureaucrats, and the colonial officials were encouraged in this passive acquiescence by years of skilful Ger. propaganda, in which the 'dangers' of liberal democracy to property were linked with the 'menace' to France of the world leadership of a liberal and bellicose Britain. The struggle for France's freedom against Germany was distorted into Britain's attempt to fight a war with the man-power of France and to keep the continent of E. weak by perpetuating, at the cost of war, the enmity between those two 'natural allies' France and Germany. Fantastic as it may sound, this interpretation was believed in Vichy. It is the

less fantastic when it is realised that the rival ideologies of fascism and communism or republicanism had already resulted in the triumph of fascism in Italy, Germany, and Spain. In France political life had been unstable for several years. The communists had split the ranks of the working-class at the crisis of the anti-fascist struggle. The covert friends of fascism in the critical days of 'non-intervention' in Spain proved too strong for the wealthy socialist, Blum, and the leaders of the 'Popular Front,' who therefore lost the support of the Fr. Social Democrats. The weakness and corruption of the rulers of France created an unique opportunity for the party of progress; but it was missed. Since the last war France had been ruled by men who were incapable of meeting the challenge of their epoch. They sought their allies in a Mussolini, a Franco, in Arab landlords and in any and every group except those who were, by necessity, anti-fascist. The 'principles of 1789' were no longer popular with the Fr. bourgeoisie, for they were now identified with bolshevism. Hence the united front which was presented to the Ger. invader in 1914 had long been undermined by 1939, and in the hour of defeat the conservative elements looked for leadership to men like Laval, Flandin, and Bonnet. After the Fr. collapse, the Gers. were in a specially favourable position to play upon Fr. feelings of resentment against Britain—the blockade, air bombardment, industrial and business dislocation—all these could be laid to the door of the Brit. people under the 'war-mongering' leader Winston Churchill, and to their obtuse determination to carry on the war against a 'united' E., which was only waiting for the end of Britain's insane onslaught to organise prosperity under Ger. leadership—the 'New Order' (*q.v.*).

Admiral Darlan's Attack on Britain.—By the middle of 1941 the phase of 'collaboration' between France and Germany had advanced far. The final step of military collaboration was inherent in the position adopted earlier at Montebello, when a kind of economic *modus vivendi* was reached. For in total war the distinction between economic and military collaboration is impossible to maintain. Through their control of raw materials, the Ger. officials in Paris were able, soon after the Fr. defeat, to control industry throughout the country, and they found willing collaborators among the leading industrialists. With a show of independence Marshal Pétain stated that in collaboration with Germany 'France would preserve her continental and colonial status' (May, 1941); but the Brit. Gov. had no choice but to interpret the statement as one that paved the way to joint action in N. Africa—which indeed had been threatened by Adm. Darlan—by the Fr. and Ger. navies. By this time, indeed, Pétain's name and authority served only to cloak and excuse surrenders to Germany. The most important man in France now was Adm. François Darlan, who had never forgiven the

damage inflicted on his ships by the Brit. navy at Mers-el-Kebir nor the implication that his word was not to be trusted. He had, moreover, convinced himself that England, in spite of Amer. support, was doomed to defeat. But though probably at first he did not intend to betray his country but simply to obtain, through collaboration, the best possible terms from Germany, he had, under constant pressure from an unscrupulous enemy, who alternately flattered and threatened, ended by selling himself body and soul to France's conquerors, knowing well that Hitler intended to annex all the N. and N.E. of France up to the R. Somme, in addition to Alsace-Lorraine. The previous Dec. Laval (*q.v.*) had been ignominiously dismissed for having tried to foist on France a policy similar to his own, and at that time there were many patriotic ministers who would not have allowed themselves to be committed to a dishonourable policy, however immediately profitable. But Darlan had no such scruples and, on assuming power as minister of foreign affairs and of the interior, which gave him the key posts of the country, he at once secured the dismissal of these ministers. He tried to convince his countrymen, most of whom were passionately opposed to this policy, that he was adhering to the terms of the armistice; but under increasing Ger. pressure and under the haunting fear of reprisals exercised on the 2,000,000 Fr. prisoners of war in Germany, he finally abandoned subtleties, violently attacked Britain, whom he accused of wanting to starve France and cut her off from her empire, and threw in his lot deliberately with Germany.

*The Brenner Conference.—*Hitler's preoccupation with Russia.—In the mid-summer of 1941 Germany's political efforts were concentrated on promoting the 'New Order.' Hitler convened a conference with Mussolini at the Brenner in order to give weight to his diplomatic manoeuvring, especially in the W. Inspired reports of the conference spoke of the stabilisation of peace in Europe and the organisation of a unified economy. Mussolini himself by this time had no more significance than a Pétain or an Antonescu, and, indeed, so anxious was Hitler to secure the complete collaboration of the Vichy Gov., that nothing more was heard of the former It. 'claim' to Tunis, Corsica, and Nice. Not even Croatia was given to Italy, for shortly afterwards it was announced that that country had become a member of the Axis Tripartite Pact. But as a political sop Greece, now conquered by Ger. troops, was assigned to Italy. This vicarious generosity on the part of Germany was really dictated by Germany's preoccupation with Russia. Both Germany and Russia were now aligning their common frontier with vast armies. If garrisons for Greece would operate to release seasoned Ger. divs. for that frontier, especially as a move against Russia might easily bring Turkey into the war, and the divs. which had reduced

Greece could be used to encircle Turkey and advance through Asia Minor on Iran. These were the prospects at this time, but no manoeuvrings in the S.E. or east of E. could in any way lull Britain into a sense of false security. The previous year it had been to Hitler's advantage to grant France an armistice and to reserve the discussion of peace terms till the war was over. Thus by a process of blackmail he had succeeded in forcing the Vichy Gov. to surrender and so secured considerable advantages in waging war on Britain. But he had to recognise the force of hostile opinion in the U.S.A., and so now wished by all means at his disposal to confront the Americans with a set of facts that would strengthen the argument against taking part in the war. He wished that his 'new order' might seem to have pacified and organised Europe, so that Brit. resistance was hopeless and so that all that the U.S.A. could hope to achieve by entering the war would be to prolong it. For that purpose it would be useful to make peace with France—a peace that could be trumpeted to the world as the close of the long story of deadly rivalry that had produced such widespread disasters. His accomplice in this plan was Adm. Darlan, who in Dec. 1939, had spoken of his 'close collaboration with the brave British Navy' and of the 'inviolability of moral force,' and who now told France to throw in her lot with Germany so as to find her place in the 'New Order' and 'hold up her head again.' There was, however, one fatal flaw in this dispensation: if it suited Hitler to tear up the peace treaty he gave France when the war was over, what could restrain him from so doing and what was there in his political record to suggest that he would not? For the time being, however, Hitler's immediate objective was the fullest Fr. collaboration whether in Syria, in N. Africa, or elsewhere, so as to strengthen his hand against Britain and at the same time to bring pressure to bear on Russia so as to rob her gigantic reservoir of raw materials, particularly oil and wheat.

*Russian Expansion in defence.—*Russo-German relations.—For the curtain was now about to be raised on a new and startling tragedy—the German invasion of Russia. Nothing could have proved more clearly than this attack that power was the ultimate goal of Nazi policy. Yet none should have been taken by surprise: for the invasion was but the sequel to the irresistible logic of events. But, superficially, the relations between Germany and Russia had been so equivocal that European statesmen might well have believed that Germany had abandoned her traditional ideal, the *Drang nach Osten* (*q.v.*), so far as the ideal applied to the wheat of the Ukraine and the oil of the Caucasus, and was well content to purchase Russian neutrality at almost any price. Half Poland and a free hand on the "Russian fringe" were offered to Stalin by the infamous non-aggression pact of September 1939, so as to ensure Russian neutrality when Germany

launched the Polish invasion. Britain, however, refused to betray the Baltic states, and in fact was asking Russia to join in a common front against Germany in return for no immediate benefits. Yet it had been better for Stalin if he had not assumed that Russia's security was to be assured by years of exhausting trench-warfare in the west of E. But from the signing of the Ger.-Soviet Pact of 1939 until the end of the Battle of Britain (q.v.) the Soviet Gov. took advantage of Germany's preoccupations on the W. front to reinforce their own frontiers and in fact to provide ter. for a 'defence in depth' in the event of a war. The partition of Poland in 1939 was followed by the 'protection,' and, finally, the absorption, of the Baltic States—Lithuania, Estonia, and Latvia: by the war on Finland (see FINLAND—History) from which a new Russian defensive frontier was gained, if at heavy cost; and by the annexation of Bessarabia. This process of Russian expansion was resented in Berlin; but, while the rest of E. remained undefeated, Hitler was ostensibly even prepared to assist Stalin in his policy of expansion. Thus the Ger. Balts were transmigrated; pressure was put on Sweden to prevent the passage of allied troops to help Finland; and Rumania was advised to submit to Stalin's claim to Bessarabia. Nothing could better exemplify the essentially provisional character of the Ger.-Soviet Pact from Hitler's standpoint than his readiness to allow Russia to expand into the Ger. sphere of influence in the Baltic and Balkans. None knew the mind of the Kremlin. Secrecy has always been the dominant trait of Russia's relations with the world. That Teuton and Muscovite hated each other was always accepted as axiomatic. Equally nothing definite was known of the true strength of the armed forces and equipment of the Soviet or whether the many 'purges' spelt corruption or a progressive efficiency. Had the revolution imbued the Russian peasant and workman with an enthusiasm for his Communist political institutions which, under the Czarist regime, he could never have felt? Had the successive five-years' plans placed Russia on an industrial footing almost of equality with any other great nation? Was the Soviet Gov. gradually and subtly abjuring its peculiar Utopianism for a neo-imperialism? None knew precisely the answers to these and other questions, but optimistic political cartoonists in the newspapers of democratic countries never tired of representing Stalin as a mighty Gulliver holding the ill-fated Hitler in the palm of his hand and as Hitler made one 'desperate' gamble after another, the emphasis on the cunning and willingness of Stalin as the ultimate arbiter of Russo-German destinies never palled in the comments of W. publicists, and in the ultimate issue they were justified in their outlook.

It would seem to be erroneous to suppose that, when he launched his attack against Russia, Hitler was merely returning crudely to the policy of *Mein Kampf*

(q.v.); for this would be to ignore the development of Nazi technique since the previous decade or more. It was commonly accepted in Ger. foreign office circles that Germany, with her technical skill and organising ability, must somehow gain control of the resources and manpower of Russia. Some Ger. politicians, believing that the Soviet régime was moving steadily away from the tenets of the world-revolution and towards a form of 'national' socialism, thought that that régime might be prevailed on to accept a position as the Reich's junior partner. Others held that Russia must be attacked in order to effect the overthrow of the Bolshevik régime and its replacement by another more prepared to do Germany's will. Hitler, in his approach to the Russian problem, kept in being the treaty of Rapallo, whose provisions went beyond those of a mere treaty of non-aggression; for he gave large commercial credits to the Soviet Union and fostered Ger.-Russian trade; and at the same time, he mobilised Ger. opinion for the anti-Communist crusade. The isolation of Russia was a necessary preliminary, whether she was to be conquered or made into Germany's ally. That isolation was achieved at the Munich Conference, 1938. The Reich undoubtedly hoped that the pact of Aug. 23, 1939, would eventually lead to the adoption by Russia of a policy of unlimited co-operation. The 'neutralisation' of Russia, dictated by the military requirements of the moment, could be only a temporary solution. Russia, for her part, was pursuing an exactly analogous policy. Under the thin cloak of preparations against the 'Anglo-French war-incendiaries,' Stalin was seizing strategic vantage-points from Finland to Bessarabia. He seemed anxious to persuade Hitler of the value of Soviet friendship, whilst at the same time taking steps to improve the security of Russia. The Gers., just before their invasion of Russia, were looking forward to the day when a Russian gov., both anti-democratic and anti-communist, would perform for the Reich in the east of E. services, diplomatic and military as well as economic, comparable to those which the Vichy Gov. was rendering in the west of E., in the Near E., and in Africa. And just as the subservience of Vichy France did not avert the annexation by Germany of Alsace-Lorraine, so the subservience of a pro-Ger. gov. in Moscow would not, in Ger. eyes, preclude the severance from Russia of a semi-circle of 'Independent' States from Armenia and Georgia in the S. by way of the Ukraine in the W., to Lithuania, Latvia, and Estonia in the N.

It may be doubted whether Stalin ever cherished any illusions on the true nature of his relations with the Reich. Ten years before the war some elements of the Ger. staff were favourably inclined towards concluding an alliance with Russia; and Hitler, in order to win over the Ger. militarists so as to ensure his political success, had to supply convincing reasons against such alliance. These reasons may be found in his *Mein Kampf*. Here he

avers that 'one concludes no treaty with a partner whose sole interest is the destruction of the other' (25th ed., 1933, p. 750). In a speech in Berlin on May 21, 1935, he said that both 'we National Socialists and the Bolsheviks are convinced that there is a gulf between us which can never be bridged. . . . So far as this Bolshevism draws Germany into its clutches we are the deadliest and most fanatical enemies'; and in Nov. of the following year he concluded with Japan the notorious anti-Comintern Pact (*q.v.*), which confirmed his previous declarations that Germany was the bulwark of the W. against Bolshevism—a most astute move and one calculated to make its appeal to considerable numbers of people in the wealthy democracies of the world. The year 1938 saw no abatement of Hitler's anti-Russian fulminations, and this was one of the factors which induced in Mr. Neville Chamberlain and M. Daladier and their advisers the belief, in spite of the then still existing Franco-Soviet Pact, that it would be useless to try to associate Russia with the Munich conversations. The Russians were thus left in doubt on the resolution of the W. democracies as well as irritated by their own exclusion from the Munich Pact, short-lived as was this historic gesture of appeasement. But after this, Hitler's diatribes against the Soviet progressively lessened and, in the sequel, it is obvious that, as he contemplated attacking in the W., it would be to his advantage to try to lull Russia into a sense of false security. Indeed, he did not even conceal from his intimates his opinion that it would be good policy to make a temporary pact with Stalin, which he could tear up whenever he chose. Hence the next chapter in Nazi-Bolshevist relations opened with the Russo-Ger. Pact of Aug. 23, 1939 (*see above*). Whatever his personal assurances to his political and military colleagues may have been, Hitler and they hailed the pact as a triumph of Ger. reason. Jibes at the failure of the Brit. and Fr. to forestall Germany were now mingled with emphasis on the great political and economic advantages which would accrue to both signatories. Hitler now eschewed the 'assumptions' of Germany's designs on the Ukraine, Transilvania and Rumania as 'an abortion of morbid imaginations' (*Reichstag*, Oct. 6, 1939) and some two months later he sent warm birthday greetings to Stalin. His last public utterance on Russo-Ger. relations was in Berlin (July 19, 1940) when he said that those relations had been finally settled and that neither Germany nor Russia had overstepped its sphere of interests.

Hitler's 'Volte face' with Stalin—Molotov's visit to Berlin.—But the defeat of the Luftwaffe over Britain; the aid increasingly sent by America to Britain under the Lend-Lease Act; the economic difficulties of the Reich; and the realisation that Stalin was taking no military risks led to a *volte face*. Lies had served their purpose, but now deception was no longer of any political or military value. After the conquest of the Balkans, Hitler

returned to his 1936 position to prove by deeds that 'any treaty links between Germany and Bolshevik Russia . . . have no value whatsoever.' Without the slightest scruple he now reverted to his anti-Communist ideology in the belief that, by attacking Russia, he would split opinion in America which, like the rest of the free world, was bitterly opposed to Communism. But the conquest of Russia was obviously not an end in itself but a means, an incident in the struggle with Britain and America for the domination of the world, and these stark realities loomed abruptly as rocks through the fog of ideology.

Stalin, for his part, had not been guiltless of deception. His immediate fears sprang from the fact that the wealth of the Ukraine had bulked largely in the early programme as set out in *Mein Kampf*. Between 1933 and 1937 he had made strenuous efforts to ensure that if Hitler struck eastward, France and Britain would enter the war. And in these efforts he dropped dogmatic orthodox Communism and took up, instead, the line of anti-Fascism and the Popular Front; so that, in the result, both Hitler and Stalin abandoned ideology for naked power politics or Imperial aggrandisement. Yet with the boldest cynicism Hitler at this time was able to exploit the anti-Communist tendencies of the W. democracies—with entire success so far as France ultimately was concerned (*see FRANCE—History; Causes of the French collapse*) and to forge his anti-Comintern weapon for the prevention of any real rapprochement between East and West. It was his weapon against 'encirclement'; and before ever he made war, he was already using his propagandist machine to avoid a war on two fronts and, as we have seen, at Munich he secured the isolation of the Soviet. In looking back on the winter 1940–41 it is, however, easy to discern a progressive deterioration in Germano-Russian relations. Molotov's visit to Berlin left all the major problems unresolved—the Balkans, where it proved impossible to establish spheres of influence; Finland, whither Germany was already sending troops; and the Straits, where Germany refused to countenance any Russian infiltration. Soviet diplomacy was trying to stiffen the resistance of Bulgaria to Ger. pressure by the offer of a military pact—an offer which would seem to have been made also to Yugoslavia. But, as yet, there was no spectacular rupture. For the campaigning season did not open until April 1941 and the strategic conditions of a successful campaign against Russia were not yet fulfilled. As yet Bulgaria and Yugoslavia might still look to Russia as the great traditional Slav protector, and the Brit. forces were already in Greece. This dangerous flank must first be cleared before the major campaign began and the ensuing drive through Greece and into Crete (*see GREECE, BATTLE OF*), believed by some allied strategists to be the first stage of an attack on Suez, was really first and foremost an act of consolidation and

defence—the first phase of the Russian campaign. With the fall of Crete, the Dardanelles and the Black Sea were closed and Turkey was neutralised and indeed soon jockeyed by Germany into a pact of non-aggression. The attack on Russia could now be launched without fear of direct allied intervention. Ger. reinforcements arrived in Finland; units were sent N. from Greece, and on June 22, the Gers. began their offensive along the whole Russian frontier. Once again Mr. Churchill, the Brit. Prime Minister, was proved a true prophet. For months he had publicly forecast this attack on Soviet Russia and had warned Stalin. In a most statesmanlike message to the world Mr. Churchill, while bating nothing of his hostility to communism, pledged Brit. aid to Russia—as indeed to all govts. prepared to destroy 'Hitlerism.'

German Invasion of Russia—Anglo-Russian Alliance.—The Gers. launched three major attacks: in Lithuania so as to menace Leningrad; in Poland from Brest-Litovsk against Grodno and Vilna, so as to menace Moscow; and in Bessarabia, by combined Germano-Rumanian forces, across the Pruth, aimed against the Ukraine. Soon afterwards, further attacks developed in White Russia, particularly around Minsk, in Finland and around Murmansk (for this great campaign, see EASTERN FRONT or RUSSO-GERMAN CAMPAIGNS IN SECOND WORLD WAR). Russia at once accepted the Brit. offer of assistance, and a Brit. mission went to Moscow. The Baltic states were soon largely overrun, and in E. Poland the Gers. advanced a considerable distance. But from the beginning they met with unexpectedly strong resistance from the Red Army, and gradually it seemed evident that the Russians would hold their own, especially as they were soon launching heavy counter-attacks and offering a united defence even to the point of literal obedience to Stalin's order to devastate the country in the wake of their withdrawal. On July 12 the Brit. and Soviet govts. signed a formal agreement undertaking to render each other all assistance in the war 'against Hitlerite Germany,' and to negotiate no armistice or treaty of peace except by mutual consent. The precedents of this and the previous war, when similar declarations were regularly exchanged between allies, made the agreement tantamount to an alliance, and it was so described by Mr. Churchill. It embodied the undertakings which had already been given by the Brit. Gov. to support Russia to the utmost in the conduct of the war; but it also went further; for it implied the necessity of agreement on the terms on which arms should be laid down and therefore of a common elaboration of peace aims. Since the experience of the previous twenty years had plainly demonstrated that a stable settlement of the affairs of Eastern and South-Eastern E. could not be achieved without Russian participation, this conclusion was warmly welcomed by public opinion in Great Britain.

Russo-Polish Agreement (July 1941)—

Allied guarantee to Turkey.—The over-running of E. Poland by the Gers. necessarily brought into sharp relief the political relations between the Poles and the Soviet Gov. The natural solution was for the Soviet to forgo her 'conquest' and pledge her word to the cause of Polish independence. Hence on July 30 the Soviet Gov. and Gen. Sikorski, Polish Prime Minister, concluded an agreement by which the Soviet-German Treaty of 1939 regarding territorial changes was declared void. The two govts. agreed to render each other mutual aid of all kinds in the war against Hitlerite Germany, and it was arranged to raise a Polish army of some 300,000 troops on Russian soil. Thus the common factors of hostility to Hitlerism and alliance with Great Britain apparently overrode the differences of a century and a half, and even if both govts. had to make some political sacrifice, both realised that the need of unity among the states defending civilisation rose superior to the individual need of any one of them. The delimitation of the new frontiers was, however, left over until the end of the war. Shortly after this agreement, the Brit. and Soviet Govts. made a joint declaration in Ankara guaranteeing help to Turkey if she were attacked by a European power and renewing pledges to respect the territorial integrity of Turkey and the Montreux Convention of 1936 regarding the Straits. This joint disclaimer of aggressive intentions or claims upon the Straits went far to dispel much of the suspicion which had clouded Russo-Turkish relations in the years recently passed. These relations had been increasingly friendly since the Soviet Gov. had supported Turkey in the struggle for political and economic independence which ended in the treaty of Lausanne, 1923 (q.v.). They deteriorated after the signing of the Russo-German Pact of 1939 because the Turkish Gov. suspected that by way of set-off to that pact the Brit. Gov. might make pacts with other nations at the expense of Turkey, or that they were prepared to conclude a secret agreement with the Soviet giving that gov. complete control of the Straits.

The Atlantic Charter.—Germany's diplomatic situation had deteriorated since the heyday of her military successes in Greece and Crete. Held up in her giant thrusts at Leningrad, Moscow and Kiev, Germany was more than ever anxious to create a diversion which should prevent Britain from fully concerting her strategy with Russia. The prospect of a long campaign in the east of E. meant time for the Allies to make joint military plans, as well as to apportion between them the munitions, planes and guns the U.S. Gov. was so willing to give. It also spelt increased pressure by Germany on Vichy France, Spain, and Japan. It meant extending the war while there was yet time to make a good case on paper for the ultimate triumph of the new dictatorial spirit and the 'New Order,' if only those who hoped to profit by it would come quickly to the aid of the chief protagonist. Germany therefore now endeavoured to divide her

opponents, so that they might be conquered in detail, by occupying the Brit. in the Middle East with or without the compliance of Turkey. She undertook so to manipulate or coerce the Vichy Gov. as to restore the situation of the Axis in the Mediterranean and afford it a new sphere of mischief in W. Africa. In this way Germany hoped to be in a position to promise Spain a greater measure of security in return for help at least in Africa, if not in E. Meanwhile, by virtue of the menace she hoped to offer to Iran and Iraq, and later to India, Germany counted on reassuring the doubts of Japan, which country had now, in spite of warnings from the U.S. and Great Britain, landed a force in Fr. Indo-China (q.v.). Above all, Hitler needed Japan to engage not only Britain in the Far E., but also the Americans, lest the latter should successfully carry out her projects for arming Britain and Russia with an ever accumulating weight of material. Towards the middle of Aug. 1941 it was generally believed that Germany intended to put forward 'peace' proposals, designed to perpetuate Hitler's 'New Order' and, above all, to accentuate the split in America between the pro-Ally public and the isolationists. But this move was forestalled by an historic meeting at sea on Mr. Roosevelt's invitation between the President and Mr. Churchill, the outcome of which was a joint statement of principles on the national policies of their respective countries on which they based their hopes for a better future for the world—a remarkable manifesto and entirely without precedent or parallel, for it was in effect a pact between a belligerent and a non-belligerent. (See ATLANTIC CHARTER.) The two statesmen were accompanied by officers of their military, naval, and air services, and the whole problem of munitions supply as provided by the Lease-Lend Act for the armed forces of the U.S.A. and for those countries actively engaged in resisting aggression was examined anew. Lord Beaverbrook, Brit. minister of supply, also took part in the conferences and later went to Washington to discuss also the supply problems of Russia.

Surrender of Greek Army—Battle of Crete—Moscow threatened—Britain declares war on German satellites—America enters the war.—The year 1941 will stand out in the hist. of E. as the time of building up a greater alliance for the defence of civilisation. The Brit. blockade of Ger. E., reinforced by the arming of Amer. merchant ships, the amendment of the Neutrality Act (q.v.), and the landing of Amer. naval forces in Iceland, was now the key to the whole strategic situation; for the Ger. blockade of Britain, if dangerous, was never more than a diversion. The weakest link in the Brit. chain of encirclement was the Mediterranean where the struggle for control greatly fluctuated. When Gen. Wavell shattered Graziani's army in Libya (Jan.—Feb. 1941) the balance swung in Britain's favour just as it had in the previous year after the devastating attack on the It. fleet in

Taranto. But the advantage was now lost when troops from Wavell's army had to be withdrawn to meet the Ger. invasion of Greece. The main force of the It. navy now ventured out to sea (March) in the hope of cutting Brit. communications between Alexandria and Crete or Salonika; but it was detected and routed by Adm. Sir Andrew Cunningham at the battle of Cape Matapan (q.v.). The surrender of Prince Paul of Yugoslavia, however, led to the defeat of the Yugoslav people who had risen gallantly in repudiation of Prince Paul's policy, and the Ger. army penetrated the Monastir gap and seized Salonika (April 9). Brit. and Imperial forces came into action at the side of the Gks. but the odds were too great and the Gk. forces in Epirus and Macedonia surrendered (April 23). The last of the Imperial forces, evacuated on May 2, prepared to resist in Crete, but within a few days of the first Ger. onslaught the Brit. troops were driven out of the is. Thus by midsummer the area under Ger. control had been expanded S.E. to include the whole of the Balkans with the Aegean Sea. These advances had been watched with foreboding by the Soviet Union and the renewal of the Russo-German Pact of 1939 did nothing to allay Stalin's suspicions. Stalin realised that Hitler had come to the conclusion that he could never proceed with the long-projected invasion of Britain without first getting control of Russia's great resources nor while the vast military forces of the Soviet remained undefeated on Germany's E. flank. These forces had been augmented all along the frontier as suspicions of Hitler's intentions hardened into certainty, and very soon the alleged menace of these defensive preparations were made the pretext for launching the Ger. invasion. This was so successful that by autumn the advancing Ger. armies had enveloped Leningrad and threatened to surround Moscow, while the rich industrial and agric. region of the Ukraine passed almost entirely into their hands.

The outbreak of war on the E. front changed the whole aspect of European and world affairs. On the Axis side troops from the subject countries of Hungary, Rumania, and even Italy were soon thrown into the struggle. Finland, resenting its defeat in 1939-40, was soon induced to co-operate in the invasion of Russia. Later, in response to Russian requests, Britain declared war on these Ger. satellite countries. But for geographical reasons the help which Britain might render Russia could only be in the form of munitions of war and even then delivery involved hazardous convoy operations in the Arctic. The joint determination, by means of munitions deliveries, to buttress Russian resistance drew Great Britain and the U.S.A. closer together. The next step was to formulate concrete plans for assistance to Russia. An Amer. representative, Mr. Harry Hopkins, was sent to E., and he and Lord Beaverbrook went to Moscow where Marshal Stalin presented a formidable list of his requirements in machinery, weapons

and munitions. All these demands the Brit. and Amer. representatives, despite the strain on their countries' resources, guaranteed to supply. The entry of Russia into the war brought new hope to the defeated nations. The spirit of revolt in France expressed itself in sporadic acts of violence, followed by ferocious reprisals by the occupying Gers. Meanwhile the tide had turned in Russia. The Russian winter fell with devastating effect on the ill-protected rank and file of the invading armies. The misery of the Ger. soldiers in the intense cold could not be concealed from the Ger. people, and the situation became so aggravated that Hitler tried to restore confidence by assuming personal command of the Ger. armies. Greater help than the much-doubted 'intuitive' guidance of the Führer was, however, forthcoming for the Axis from the Far E. when the treacherous Jap. attack on Pearl Harbour brought America into the war overnight. Though the year ended with heavy territorial losses for the Allies in the Far E. theatre of war, in Europe and N. Africa, on the other hand, the legend of Nazi invincibility had been shattered for ever. The new alliance, disposing ultimately of resources far transcending those of the Axis, had been firmly estab., though a long period of effort, more intense than any yet undertaken, had to be faced before the decisive strength of the grand alliance could be made effective.

German Spring Campaign of 1942—Russian Counter-thrust against Kharkov—Defence of Stalingrad.—The Russian counter-offensive, which had relieved the gloom of Dec. 1941, was brought to an end by the Jan. frosts, and left the Gers. to resume preparations for the spring campaign. Heavy disasters befell the Allies in the Far E. and further threats there were fast developing. These would be multiplied when spring came to E. With a huge army poised in Britain, and now augmented by thousands of Amer. troops, there was growing popular clamour for some more obvious expression of Brit. power in the main theatre of war. This took the form of a demand for the invasion of N. Europe, an agitation founded on a chivalrous eagerness to share the heavy burden borne by Russia. Yet the real key to the situation was the control of Africa and the Mediterranean, in which sea the garrison of Malta alone kept the Brit. flag flying in what had become almost an Axis-controlled *mare clausum*.

By the time the snows had melted on the Russian front the Ger. armies were massed for a great onslaught. By a bold counterstroke, however, the Russians forestalled the attack and themselves delivered a powerful thrust against Kharkov (May 1942). This counter-attack did not win Kharkov, but by disorganising the Ger. plan hampered their summer campaign, and therefore had a far-reaching influence on the ultimate issue of the war. Meanwhile M. Molotov (q.v.), Russian foreign commissar, visited London for conferences on allied strategy, and an

alliance was then concluded between Great Britain and Russia to last for twenty years and to associate the two nations in the post-war settlement of E. When the expected Ger. offensive came, it proved not to be, as in 1941, a general advance on the whole front, but to be concentrated on the S. sectors, beginning with the Crimea. Fierce protracted battles were fought but the great fortress of Sevastopol held out with heroic tenacity, and only capitulated on July 1, having gained time of incalculable value. Nonetheless the Ger. offensive was surging ahead with alarming momentum towards the Don, on the upper reaches of which riv. the Gers. were contained by a determined Russian defence, pivoting upon a solid bridgehead at Voronezh; but below that tn. it proved impossible to stem the ferocity of the attack. The Gers. having reached the lower riv. at a point above Rostov, that city surrendered on Aug. 28. The Russians therefore decided to withdraw from the whole huge area comprised within the loop of the Don, and continue the defence from outside it. This retreat involved the abandonment of one of the richest industrial regions of Russia, but it enabled a more tenable line of defence to be formed. The Gers. having captured Rostov, hastened to exploit their success in two directions: one great army wheeled right to invade the Caucasian passes through which they hoped to march before winter and so reach the Caspian Sea and the oilfields of Baku; another army advanced straight forward to cut the chief remaining life-line of the Soviet, the Volga. But at this critical juncture the Russian resistance buttressed itself upon the steel city of Stalingrad, at the point of the Volga nearest to the Don; and by the heroic endurance of the garrison and people of that fortress, continued over several weeks, gradually fought the invaders to a standstill.

This remarkable defence entailed the defeat of the Gers. main strategical intentions for the year and the autumn of 1942 may be regarded as the dividing line in the calendar of the war. Both sides knew that the initiative of the Axis in grand strategy was spent at last and that with their increasing resources the United Nations would soon be in a position to attack. The Ger. leaders indeed tacitly acknowledged this governing fact in their public utterances, and their purpose now was to convert E. into an impregnable Ger. fortress, capable of resisting an indefinite siege until war-weariness or internal dissension should cause the allies to give up their efforts to reduce it. To this end the Gers. ruthlessly exploited the occupied lands, as sources of supply of man-power, food, and munitions. Rumanians, Hungarians and others were sent in thousands to the Russian front; and by a campaign of cold-blooded murder and cruelty unmatched in recorded annals, an attempt was made to wipe out the whole Jewish race. It was at this time (Oct. 23) that Gen. Alexander (q.v.) launched the Eighth Army (q.v.) to the attack on the Axis positions at El Alamein. The entire

success of these operations was of good augury for the Allies, for in the result the Ger. and It. armies were driven out of N. Africa or captured and the way opened for the invasion of Italy in the following year. This was achieved partly through the victory of El Alamein and partly by the surprise landing of an army of Brit. and Amer. troops at key points of Algiers and Morocco. With but a token resistance the Fr. garrisons surrendered and the two colonies threw in their lot with the

situation reflected the closer inter-allied planning though, at the opening of 1943, it could not be said that completely unified counsels had prevailed. Russia was pursuing her triumphant campaign according to a plan separately evolved, whereas the Anglo-Amer. war effort had been co-ordinated from the start. Hence in Jan. 1943 President Roosevelt and Mr. Churchill, with their military advisers, met at Casablanca to plan the conduct of the war by a more closely integrated



RACE PERSECUTION : POLAND

E.N.A.

Allies or United Nations as they were now styled. The response of the Axis to these events was to man the battlements of the threatened fortress of E. The Ger. army marched into the unoccupied zone of France, the Fr. navy scuttling their ships rather than surrender them to the enemy; and the Its. were permitted to occupy parts of S.E. France. The spirit of victory seemed to influence the Russian front too; for on November 20 a severe check was administered to the Wehrmacht in the Caucasus; while two days later an impressive counter-offensive began in front of the bloody but unbowed city of Stalingrad, and so powerful were the Russian blows that ere long a Ger. army of 300,000 men was completely encircled. *Casablanca Conference—German Sixth Army annihilated by the Red Army—Kharkov retaken by the Russians.*—The increasing allied control of the general

effort. Stalin was invited but was unable to leave Russia. Russian needs were discussed at the conference, whose primary object was to 'draw as much of the weight as possible off the Russian armies.' For the time being precedence was given to the destruction of the Axis system in Africa and Europe. The Russian armies could be relied upon to engage the main strength of the enemy throughout the year, while the Anglo-American armies battered the outer defences of the so-called 'fortress of Europe.' At the same time every effort was to be made to overcome the submarine menace and, by air power, to destroy Ger. war industry. Meanwhile the Anglo-Amer. expeditionary forces were to clear the S. shore of the Mediterranean and effect landings on the N. The immediate objective for 1943 was to eliminate Italy from the war. This programme was duly executed, and indeed

allied successes came more quickly than was foreseen at Casablanca, the chief factor being the remarkable Russian victories. On the first day of the year the Russians captured Veliki Luki, broke the Ger. lines of investment before Leningrad, and brought about the surrender of the remnants of the Ger. Sixth Army, which cut off before Stalingrad, sustained a defeat on a scale unprecedented in modern hist. The Ger. army in the Caucasus, no less baffled in its strategy, had succeeded in keeping its line of retreat open. But throughout Jan. it was falling back towards the lower Don. The recapture of Rostov on Feb. 14 marked the liberation of the main Caucasian area, and throughout Jan.-Feb. many cities in the Donetz Basin and the Ukraine were successively delivered. Khar'kov was retaken (Feb. 16) but here the Russians had outrun their communications and the Gers. struck back and recaptured the city (March 15).

Allied Invasion of Sicily—French Fleet joins the Allies—Collapse of Italian resistance—German retreat from Donetz Basin.—By May 13 the Axis had lost its last foothold in N. Africa with the surrender of their forces in Tunisia and the Allies at once prepared to cross the Mediterranean and complete the overthrow of Italy. The summer campaign of 1943 was marked by two significant political preludes: on May 22 the Soviet announced the dissolution of the Comintern, the revolutionary organ which had for many years proved an obstacle to harmonious relations between Russia and the W.; and on July 3 the rival leaders of pro-Ally France, Gens. de Gaulle and Giraud, reached agreement, and a Committee of National Liberation was formed to direct the Fr. share in the campaigns of reconquest. On May 31 the Fr. Fleet at Alexandria, which had been neutralised since 1940, joined the Allied navies.

The fact that in the Far E. the Jap. were everywhere held meant that the largest possible forces could be committed in E. for the reduction of Axis forces and resources. In the Mediterranean the Allies, after feints which achieved no small measure of strategic surprise, launched their invasion on the S. corner of Sicily by an amphibious operation on an unprecedented scale. While the Amers. cleared the W. part of the Is., encountering no serious resistance, the Brit. Eighth Army advanced irresistibly on Syracuse and Catania against a dour defence which was mainly in the hands of a strong Ger. garrison—for the spirit of the Is., after their experiences in N. and N.E. Africa, was broken. Meanwhile the evident collapse of It. resistance had caused revolt on the It. mainland and dismay in the Palazzo Venezia. In this conjuncture Mussolini importuned Hitler at Verona (July 24) for succour, but by this time the Ger. army in Russia was too hard-pressed for such aid to be practicable. The following day the Fascist Grand Council met and deposed Mussolini, and an emergency gov. under Badoglio dissolved the Fascist Party and sent over-

tures of peace to the Brit. Gov. While the It. emissaries, who had been referred to the joint authorities of the United Nations, were passing backwards and forwards between Rome and Lisbon, the invasion of the It. mainland had begun, and on the day (Sept. 3) that the Brit. Eighth Army entered Calabria, Badoglio's envoys had secretly given in their 'unconditional surrender'—as required by the Casablanca declaration. This heavy blow to the Gers., who thenceforth had to garrison with their own resources, not only the It. mainland but the great Balkan regions hitherto garrisoned by It. troops, came in the midst of a disastrous campaign on the E. Front. In previous years the summer fighting had always favoured the Ger. arms; this time the tables were turned when the Gers., striking against the great Russian salient at Kursk, were held and then hurled back with great losses by a powerful Russian counter-offensive. Throughout Aug. and Sept. numerous Russian cities were delivered, including Orel, Kharkov, Bryansk, Smolensk, Taman, and Taganrog. The early autumn found the Gers. in headlong retreat out of the Donetz basin and with difficulty taking up prepared positions on the lower Dnieper. By the end of the year, however, the Ger. grip on the riv. itself was almost everywhere broken, though they still clung to a large area in the S. bend of the riv. On Nov. 6 the Russians retook the historic city of Kiev and speedily developed a vast salient, in the process cutting the most important lines of lateral communication left to the Gers. on Russian soil. When the frosts descended on the N. half of the front the Russians opened their winter campaign with a deep penetration near Nevel. By Christmas the Ger. counter-offensive, for which they had concentrated the greater part of their armoured strength, was exhausted, and the Russian forces under Gen. Vatutin (*q.v.*) struck back from the S. of the salient in a powerful counter-thrust.

The surrender of Italy was made public on Sept. 8 simultaneously with fresh Allied landings near Salerno. This operation met with somewhat chequered fortune, but by Oct. 1 Naples had fallen, though the road to Rome remained barred till the summer of the following year. In Corsica and Sardinia native co-operation was instrumental in driving out the Gers. but an allied expedition to take the Dodecanese Is., frustrated in expectation of help from the It. garrison, was overwhelmed by a swift Ger. counterstroke. In the Balkans, however, the It. surrender gave greater scope to the partisan forces of the enslaved countries, though in both Yugoslavia and Greece their exploits were to some extent discounted by dissensions amongst themselves or with their exiled govts.

United Nations Relief and Rehabilitation Administration—Moscow Conference of Foreign Ministers.—With so many signs of ultimate victory and its concomitant anxieties and responsibilities, there was a growing concentration of

thought upon the problems of future reconstruction. For shorter term problems of liberated E. there was set up the United Nations Relief and Rehabilitation Administration (U.N.R.R.A.); and a corps of administrators (Civil Affairs) was formed, under military responsibility, to provide for the military gov. of enemy ter. and initial civil gov. of liberated ter. A conference of the foreign secretaries of America, Britain, Russia, and France met in Moscow (Oct. 19) and dealt with questions concerning the treatment of Hitlerite Germany and her satellites, economic co-operation and assurance of general peace. It was also decided to set up in London a European advisory council for 'the examination of European questions as the war developed.' As to permanent machinery to replace the League of Nations Covenant, the four Powers recognised 'the necessity of establishing at the earliest practicable date a general international organisation, based on the principle of the sovereign equality of all peace-loving States, large or small, for the maintenance of international peace and security' (see further under UNITED NATIONS, CHARTER OF THE). Two other declarations dealt directly with Germany: one announced plans for the trial of Ger. war criminals, while the other favoured the re-establishment of an independent Austria (see CRIMES, WAR; NUREMBERG TRIAL). Other conferences followed including a meeting at Teheran between Roosevelt, Churchill, and Stalin who issued a manifesto declaring that the Ger. forces would be destroyed by operations of agreed scope and timing from E., W., and S., and accepting responsibility for a peace that would 'banish the scourge and terror of war for many generations.' On his return to Moscow Stalin was visited by President Benes, who signed a treaty of alliance between Russia and Czechoslovakia similar in general terms to the Anglo-Russian treaty.

Red Army clears the Crimea—Rome taken by the Allies.—The year 1944 found the Allies at last deployed in their full military might. The usurper power, which at the beginning of the year still held most of E., was reduced to the defence of its own frontiers. The assumption in Jan. by Gen. Eisenhower (q.v.) of the supreme command of the allied forces concentrated for the invasion of western E. heralded the outstanding military enterprise of the year. But meanwhile the main offensive power remained with the Red Army, while to the Eighth and Fifth Allied Armies in Italy was assigned the duty of checking the powerful Ger. force of Kesselring (q.v.) S. of Rome. The Red Army, having in the last days of 1943 stopped the Ger. thrust against the Kiev salient, now burst out from its S. flank towards the Bug and at the same time conducted a still larger campaign in the N., where Leningrad was completely liberated and Finland isolated. In March the Russian armies in the Ukraine swept over the riv. barriers in the S. half of the front and crossed into Rumania, threatening the Danube basin. On the

left flank of this advance Odessa was liberated (April 10), the Crimea was cleared in May, and Sevastopol recovered. In the N. a new offensive against Finland pierced the Mannerheim line (June), by which time the focus of strategic interest had shifted to France. Meanwhile the deadlock in Italy was resolved by sea-power which covered a new landing at the Anzio-Nettuno beaches. Like the Salerno landing this new venture made but slow and precarious progress; but by dour resistance against repeated attacks the invading troops held firm on the beaches while the forces on the main front broke through the Gustav Line and effected a junction with them. Thus the Ger. flank was turned and the road opened to Rome, which fell on June 4.

Allied Invasion of Normandy—Political reactions in Germany.—After being at least once deferred owing to adverse weather, the immense and hazardous amphibious operation of landing on the coast of Normandy was begun on the morning of June 6, the culmination of months of intensive but hidden activity in Britain and America and on the Atlantic seaways, directed to the marshalling and equipment of the greatest army of invasion ever launched overseas against a hostile shore. The hub of the great battle of Normandy was a tactically defensive position covering Caen, which was taken on July 9, and thereafter for sev. weeks the most dangerous hostile striking force was pinned down to an almost static battle. But after Cherbourg fell (June 26) and the Amer. armies turned S. again to break through the Ger. lines at St. Lô and sweep out into Brittany, there followed a rapid and dramatic transformation of the whole aspect of the campaign. Brittany was rapidly overrun and its Ger. garrison took refuge behind the fortifications of Brest, Lorient, St. Nazaire, and St. Malo. While the Brit. and Canadians held the enemy before Caen, the Amers. turned eastward again and advanced through Anjou and Maine and so threatened to take the enemy's great panzer army in the flank. The Ger. commander, Rommel (q.v.) now tried to evade the trap by a bold counter-offensive aimed at the hinge of the Amer. wheel at Avranches. His failure led to the headlong retreat of the entire Ger. army, and a substantial part of it was destroyed at the Falaise gap (see WESTERN FRONT IN SECOND WORLD WAR), the remainder retreating to the Seine and across the riv. after destroying most of the bridges. In the vain effort to sustain the defence of Normandy S. France was denuded of first-line Ger. troops and a landing, based on Italy, was easily effected by a new Allied army which quickly captured Toulon and Marseilles and advanced up the Rhone valley. Its progress was effectively assisted by men of the Fr. *maquis* (or partisans) and many great cities, including Bordeaux, were liberated by their own countrymen; while a well-prepared insurrection had almost completed the expulsion of the enemy from Paris when the Fr. and Amers.

entered the city on Aug. 25. A provisional gov. was at once set up under Gen. de Gaulle. On the left of the line the continued pursuit of the retreating Gers. soon brought the Brit. and Canadians into Brussels, and most of Belgium and part of Holland were freed by the early autumn.

The political reactions of these heavy defeats in Germany were profound. An important section of the military caste apparently attempted to overthrow the leaders whose policy and strategy had led to these disasters, while an abortive attempt on Hitler's life on July 20 was followed by a ruthless purge in the course of which many officers of the highest rank were hanged. The morale of the Ger. people at this critical time seems to have been sustained mainly by the vain hope of destroying their foe in England by the aid of 'secret weapons' such as flying bombs (q.v.) and rockets (q.v.) which caused considerable destruction of civil life and property in S.E. England and Belgium, but had only the most negligible effect on the war effort.

Red Army's Summer Offensive of 1944—Russians Conquer Rumania—German retreat up the Danube—Red Army invests Budapest.—At the end of June the Red Army opened their summer offensive. In the centre of the front they quickly overran all E. Poland and approached the Vistula, at which moment the underground forces in Warsaw, vainly anticipating the relief of the city by the Russians, rose prematurely against the Gers. The Gers., however, by a formidable concentration of armoured reserves, threw back the relieving forces and then turned on the Polish patriots in Warsaw, subjecting them to merciless reprisals. The incident embittered the already strained relations between Russia and Poland, arising out of the Russian claim to retain the provs. seized from Poland in 1939. Further N. the Russian armies forced their way through Lithuania to the mouth of the Niemen, and Riga fell to them on Oct. 13. Their attempt at this time to cross the frontier of East Prussia, however, met with such determined resistance that it was not resumed until the next year. Meanwhile a series of minor operations had begun the process of eliminating the satellites of Germany in eastern E. Finland gave up the unequal struggle and signed an armistice at the end of Sept. whereby she agreed to co-operate with the Allies in driving the Gers. out of her ter.

On the S. half of the E. front the Russian advance was now resumed, both over the Carpathian passes and up the Danube valley. Constantza, Ploesti and Bucharest fell on successive days at the end of Aug. and Rumania then sued for peace and re-entered the war on the side of the Allies. Bulgaria, thus isolated, also submitted to the Allies' terms. These defections not only forced the Gers. to a hasty retreat up the Danube, but imperilled their armies of occupation in Yugoslavia and Greece, which now began a hazardous withdrawal, continually harassed by Marshal Tito's partisans who

had now grown into a formidable army. Mainly by the efforts of the Gk. guerrilla bands, Greece was completely liberated by the autumn. The position in the Balkan peninsula being now adjusted, the Red Army pushed on into central E., converging upon Hungary by way of the Danube and over the Transylvanian Mts. The Ger. nominee Hungarian Gov. fled from Budapest, which was completely invested on Christmas Day, while the civil pop. of Austria was forced by their Ger. masters to the labour of preparing fortifications on the approaches to Vienna. The Red Army's thrust towards the S. provs. of Germany thus tended to become concerted with the campaign of the Allied armies in Italy, which during the autumn had conquered Tuscany and, turning the Apennine barrier, debouched on the basin of the Po. The Russian pressure towards Austria was becoming a threat, if still a remote one, to the communications maintaining the Ger. resistance on this front.

The campaign on the W. Front now seemed stationary relatively to the mobile conditions of the summer, but the methodical massing of force opposite the Siegfried Line (q.v.) still involved hard fighting. The main battles were brought about by operations to extend the Allied grip on the classic gateways to Germany—the gaps of Belfort, the Saar, and Aachen. The last-named city, the first major city of Germany to fall to the Allies (Oct. 21), thus became the seat of the first experiment in the civil administration of hostile ter.

Post-war problems of liberated countries of Europe—Internecine strife in Greece.—From the time of the landing in France an over sanguine sense of the imminence of complete victory in E., pervaded the public mind, which naturally became ever more interested in post-war problems, and in some of the countries suddenly liberated from Ger. tyranny the difficulties of transition were only too evident. In Belgium Brit. arms had to be invoked for a short time to prevent violence between rival parties. In Greece actual civil war broke out and raged till the end of the year. The Brit. troops in Athens, endeavouring to disarm the contestants, became involved in the controversy and even the personal intervention of Mr. Churchill, who flew to Athens on Christmas Day, did not bring the internecine strife to an end, though one good result was that the archbishop of Athens assumed the regency.

Failure of von Rundstedt's Counter-offensive in the Ardennes—Red Army on the Oder—Yalta Conference—Allied Advance across the Rhine—Conquest of East Prussia—Fall of Berlin.—In Dec. von Rundstedt (q.v.), the Ger. commander-in-chief, made bold attempts to restore Ger. fortunes by a powerful thrust through the Ardennes (see WESTERN FRONT IN SECOND WORLD WAR); but at the turn of the year the Allies launched a counter-attack which threw the Gers. back on the defensive. The failure of this ambitious offensive proved strategically disastrous to the Ger. commander, for his enterprise had necessi-

tated fighting the decisive battle of the campaign W. of the Rhine and made it certain that he would not have the strength for a protracted defence after the riv. was crossed. In the E., by the middle of Jan. 1945, the main Russian line was sweeping irresistibly over the frozen plain of Poland and up to the Oder opposite Berlin by the beginning of Feb. Here there was a pause; but meanwhile other Russian forces occupied Budapest (Feb. 13) and pressed on into Austria. A thrust towards the mouth of the Oder cut off E. Prussia, which was now gradually reduced in bitter fighting. The resumption of the advance from the middle Oder brought the Russian armies into the



Imperial War Museum: Crown copyright

1945: EAST MEETS WEST

A British soldier of the 6th Airborne Div. greets a Russian tank man near Wismar, in the Baltic, May 3, 1945

suburbs of Berlin in mid-April, and S. of the capital mobile detachments broke through the enfeebled resistance to the banks of the Elbe. While this last great surge of the Red Army was in its initial stages, Mr. Churchill, Mr. Roosevelt and M. Stalin held a conference at Yalta (q.v.) in the Crimea to co-ordinate allied policy and administration after the subjugation of Germany which all might see to be imminent. The Conference had not ended when on Feb. 8 the Battle for the Rhine opened with a strong Brit. offensive in Holland, which towards the end of the month developed into a general attack all along the line. As soon as the exploitation of the bridgeheads won on the Rhine began it was obvious that Germany's

doom was at hand. Field-Marshal Montgomery (q.v.) swung northward to complete the liberation of Holland and to drive the confused mass of the Ger. right towards Schleswig-Holstein. At the same time the Amer. armies in a masterly operation encircled the Ruhr area and then penetrated far into Central Germany beyond that great industrial region. The Amer. Third Army drove on irresistibly under its meteoric commander, Gen. Patton (q.v.), into Bavaria and to the Austrian frontier, while the Fr. army advanced to the Swiss border from the N. In E. Prussia the Russian avalanche engulfed in its train numerous cities and strongholds. With the surrender of Königsberg (April 9) the whole of E. Prussia (q.v.) was overrun. Vienna was taken on April 13 and, on May 2, after a devastating bombardment, which completed the destruction previously wrought by Allied bombers, the surviving Nazi leaders in the city surrendered the blazing ruins of the Reich. The final disruption of the Nazi and Fascist hierarchies of E. was precipitated in Italy by Field-Marshal Alexander's forces, which, in three weeks, broke Kesselring's formidable position on the Bologna line.

Final Offensive in Italy—Germany's Unconditional Surrender.—The final offensive in Italy was launched on April 9 and within a few days the Allies crossed the Po at a number of points and a Ger. collapse followed. On April 29 all the Ger. forces here and in Austria surrendered. The previous day the fugitive ex-dictator, Mussolini, was caught and lynched by It. partisans near Milan. Hitler probably perished in the ruins of his chancellery, though the precise circumstances of his end cannot be established with absolute certainty. Himmler (q.v.) came forward as nominal dictator in N.W. Germany and proposed, through neutrals, to negotiate surrender to the W. allies, while continuing the fight against the Red Army. This transparent manoeuvre, in harmony with Goebbels's (q.v.) frenzied propaganda to separate the Western Allies from Communist Russia, was ignored. Dönitz (q.v.), the naval commander-in-chief, now arrogated to himself *pro tem.* the supreme power and was allowed by the Allies to sign in that capacity the act of unconditional surrender to the United Nations generally (April 29), the final submission being made at Rheims on May 7. Dönitz's signature in fact meant but little, for the Gers. were giving themselves up by whole armies in the hope of escaping the Russians; and while the guilty chiefs of the Nazi clique elected variously to take their own lives or to await their trial as war criminals, the allied armies moved into the Reich from all sides to assume the responsibility for its administration.

Atrocities of hitherto incredible horror had been revealed as the Allied forces overran the concentration camps (q.v. and see AUSCHWITZ, BELSEN, BUCHENWALD, etc.) of Germany and a beginning was made with the trial and punishment of those immediately responsible. A

more solemn act of high justice was inaugurated at Nuremberg, previously the headquarters of National Socialism (*q.v.*), where the apprehended chiefs of the party were arraigned before an international tribunal on an indictment charging them with war crimes (*q.v.* and see also NUREMBERG TRIAL).

Reconstruction Measures—Problem of Displaced Persons—Political reconstruction.—The material and spiritual ravage in E. was only too conspicuous, and a joint responsibility for the reconstruction of the continent rested primarily on Great Britain, Russia, and America; but the prospect of the continuous application of a concerted policy was prejudiced by the fact that the reconstruction proceeded in two zones dominated respectively by Anglo-American and Russian influence. Germany and Austria were partitioned for administration between the two groups of Powers, the frontier being defined by the Elbe and a continuation southward, and the Western half being subdivided between Brit., Amer., and Fr. zones. Central Control Commissions in Berlin and Vienna were appointed to co-ordinate these sev. administrations. A problem of grave dimensions confronted all by the swollen flux and reflux of millions of displaced persons—slaves of the Nazi war-machine seeking the homes in occupied countries whence they had been deported, or native Gers. for whom there was no shelter in the bomb-shattered tns. Against the background of nation-wide destitution the Allies proceeded with an attempt to reconstitute indigenous political life from the lowest local level upward, among a people whose ideas of self-government had clearly been eradicated by a decade or more of National-Socialist 'education.' The aim of some of the Powers of ultimately restoring a unified Ger. gov. or a single economic unit, was naturally opposed in the interest of her own security by France. Meanwhile the Allies proceeded to dismantle so much of the Ruhr as had not been destroyed by bombs and gun-fire, and other centres of the heavy armament industry, and convert its equipment, by way of reparations, to their own peaceful uses. On the E. side of Germany, Russian influence remained strong in the ters. that had been occupied by Russian troops in the course of the war. A part of former E. Poland was annexed by the Soviet Union, compensation being given by extending the Polish frontier at the expense of Germany, to the Oder. For this new Poland the Russians had nominated a gov. which they set up in Warsaw when they captured the city (Jan.) and this gov., slightly reconstructed, was recognised by Great Britain and America in place of the exiled gov. which had maintained its continuous existence in London. Bulgaria and Rumania were settled under coalition govs. friendly to Moscow; in Yugoslavia the victorious Tito (*q.v.*) was acclaimed by an overwhelming majority of electors, the exiled young king being deposed and a republic inaugurated. In Hungary a

general election gave the smallholders a large majority over the Communists, which seemed to show that no undue influence had been exercised by the Russian occupying authorities, whatever may have been the measure of Soviet influence in the restored republic of Czechoslovakia. Spared the worst ravages of war and restored under her former President, Dr. Benes (*q.v.*), Czechoslovakia settled down under a gov. of advanced views to a programme of reconstruction which included the nationalisation of about one thousand large industrial concerns. In Austria, as in Germany, the country was divided into four zones of occupation. Dr. Renner, a social democrat, was elected President of the republic, after having headed a gov. sponsored by the Russians. Elections in Nov. saw the virtual eclipse of the Communists, the Catholic Agrarians making large gains. In Western E. the transition from war and foreign occupation to peace and freedom was less difficult than elsewhere. Political equilibrium was secured in France under the firm but temperate leadership of Gen. de Gaulle, though economic recovery was hampered by a gravely damaged transport system and lack of supplies. In Belgium a relatively high degree of political and economic stability was attained notwithstanding many difficulties. An issue which threatened to split the country was the return of King Leopold. On his liberation by the Allies he wished to resume his functions, but the gov. declined to assume the responsibility for his return in view of the hostility towards him on account of his conduct during the war, and ultimately the regency was continued while he remained abroad. By contrast the queen of the Netherlands and the king of Norway, both of whom had resolutely sustained the long struggle, were welcomed back by their subjects with popular acclaim. Denmark, where also the monarchy emerged with new credit, returned fruitfully to the works of peace. In Russia the losses in life and treasure during the war were on a scale so vast as to subject the national resources, both material and moral, to the heaviest strain. On the fields of battle lay no fewer than seven million Russian dead. A new and characteristic five-year plan was promptly announced. The loss of six million destroyed houses had to be made good and twenty-five million displaced persons had to be settled and cared for. Russia was to be the chief beneficiary of the reparations to be demanded of Germany. Under the Potsdam agreement of Aug. 1945 Russia and Poland were to draw their reparations in kind from the Russian zone of occupation in Germany and, in addition, Russia was entitled to receive twenty-five per cent of the reparations to be contributed by the three W. zones, the allocation of the remaining seventy-five per cent being the subject of an agreement reached by an inter-allied conference in Paris. Under the Potsdam Agreement the Allies were bound to restore local self-government in Germany and to introduce

elective representative principles into the administration. The Agreement in fact provided that the administration of affairs of Germany should be directed to the decentralization of the political structure and the development of local responsibility. It was not intended to prevent progress towards a central gov. with powers necessary to deal with matters which might properly be dealt with on a nation-wide basis; but it was intended to prevent the estab. for the time being of a strong central gov. dominating the Ger. people instead of being responsible to their democratic will. These explicit agreements, signed by M. Stalin among others, were not honoured when the time came to implement them, and, in particular, the execution of the agreement that Germany should be treated as an economic unit was met on the Russian side by a blank refusal (see further under POTSDAM AGREEMENT).

Conflicting ideologies in resettlement of Europe and discussion of Peace treaties.—The W. Powers being in control of half E. and Russia of the other half, the resettlement of the whole was organised on unrelated lines. Across the line of demarcation there was little economic intercourse and from the E. side little communication of intelligence. All Governments beyond the so-called 'iron-curtain' were either members of the Soviet Union or subject to its influence. In Greece a Brit. military force ensured a régime that was liberal in form if authoritarian in practice. Following substantially free and fair elections by a Brit. and Amer. election mission, a Royalist ministry was formed on April 18, 1946, and on Sept. 1 a plebiscite resulted in a decisive vote in favour of the return of King George, who arrived in Athens soon afterwards. But the country was yet far from settled either internally or on the Albanian or Yugoslav frontiers. In all the Balkan countries, excepting Albania and Yugoslavia, stabilisation of political régimes was marked by the holding of elections. The year passed in Poland without the gov. holding the free elections to which it had pledged itself, and relations with the Brit. and United States Govs. therefore continued to be uneasy and controversial. Meanwhile the allied countries in the west of E. restored and reconstructed their political systems upon lines of parliamentary self-government. Of all the allied countries France had most difficulty in finding a political *modus vivendi* for the post-war period. The Third Republic, having been fatally discredited by the circumstances of its fall, the country was occupied throughout 1946 in the search for a new constitution. The draft produced by the first constituent assembly was rejected on a referendum in May. A second constituent assembly was elected and its revised proposals for new republican organs of gov. were accepted at a referendum in October. The provisional legislature elected at the beginning of 1946 and also that which was set up under the final constitution showed an even division of strength between three parties, Socialist,

Communist, and the Mouvement Republicain Populaire or Liberal-Catholic group, and successive administrations, before the formation of the stop-gap Socialist cabinet under the veteran statesman, Leon Blum (q.v.), were constructed upon a balance of their opinions. For nearly half of 1946 Italy was waiting for the decisions of the Allied Foreign Ministers on the peace treaty and of her own people on her future form of gov. Elections—the first for twenty-five years—were held on June 2. The Christian Democratic party emerged in great strength and were only slightly outnumbered by the Socialists and Communists combined. A referendum on the 'institutional' question showed a ten per cent majority for the Republic. King Victor, who had abdicated a month previously, was then in Egypt: his son, a king for one month, withdrew to Portugal and a former president of the Chamber was elected to the presidency of the republic.

E. being thus divided, the settlement of terms of peace seemed to resolve itself largely into a diplomatic trial of strength for the adjustment of frontiers between the rival systems. After more than twenty weeks of discussion, first in Paris and then in New York, the Council of Foreign Ministers completed (December) the five treaties with Germany's former satellite States in E.—Italy, Bulgaria, Finland, Rumania, and Hungary. A few days later the Council decided to meet in Moscow on March 10, 1947, to try to devise a common policy in Germany and Austria. Throughout the year Mr. Bevin (q.v.) and Mr. Byrnes (U.S.A.) made strenuous efforts to establish four-Power agreement on Germany, but the discussion within the Council of Foreign Ministers only served to emphasise the differences. M. Molotov (q.v.) could not agree to bring the E. zone into a common plan for treating Germany as a whole; and he alarmed his colleagues on the Council by demanding reparations from Germany to the value of one billion dollars. Among many problems the most intractable, perhaps, was that of the disposal of Trieste, which lay in the debatable area where the two rival Power systems met and served the economic traffic routes of both. A compromise, however, was reached, on the basis of the creation of a city-state internationally guaranteed and in part internationally administered.

In Germany and Austria administration and disarmament had been based by the Potsdam Agreement upon the close co-operation between the four Powers—Britain, Russia, United States, and France. This agreement of Aug. 1945 remained throughout 1946 the charter of Allied control, and though much of it was increasingly less observed and applied no attempt was made to revise it. As one consequence of it there arrived in the W. zones of Germany during 1946 nearly 4,000,000 Gers. expelled from Poland, Hungary, and Czechoslovakia. Over 2,000,000 were scheduled to enter the

Russian zone. But in one great matter co-operation was real. The state trial of the principal Ger. leaders for high crimes and misdemeanours against humanity and international law was carried to a conclusion and a number of the accused put to death by judgment of a tribunal representative of the four Powers. In administration, however, there was no such measure of agreement. No Ger. agency able to act in Germany as a whole came into being. Greater unity began to develop between the Brit. and Amer. zones, but throughout 1946 E. and W. Germany drifted further apart. The division of E. between opposed political and social systems was responsible for cutting Germany in two. Its consequent economic bisection proved most damaging; for its normal organisation of production and exchange between the industrial W. and agric. E. was wholly frustrated. The Russians devoted the food surplus from the regions which they administered to the feeding of the countries within the Communist sphere of influence, at the same time claiming industrial reparations from the W. and charging Great Britain and America with tardiness in carrying out the Potsdam Agreement for the reduction of Germany's industrial potential. In the W. zone of Germany the people were reduced to extreme scarcity of food, shelter, and fuel and were only saved from starvation by the imposition of a charge for their sustenance which, equally apportioned between the two administering Powers, involved the Brit. taxpayer in an annual subvention of £125,000,000 for at least three years. The Brit. and Amer. Govs. made an agreement to administer their combined zones as an economic unity, which the Fr. and Russian zones would be free to join at any time. Russia abstained, and so did France, whose overriding concern for security gave Ger. disarmament and resistance to the estab. of any central institutions of gov. in Germany precedence over all considerations of economic relief.

Russian Intransigence—The 'Iron Curtain'.—Hopes at the end of 1946 that the ravages of war might speedily be made good were not fulfilled in 1947. On the contrary, the disastrous consequences of six years of physical devastation and disruption in western E. and in the principal food and timber-producing zones of eastern E., together with the dislocation of the European transport system, seemed to strike the world with delayed impact. The effect of this was, however, a clearer understanding of the universal damage that had been done and a more realistic appreciation of the magnitude and quality of the efforts necessary to arrest still further deterioration and lay the foundations of a new world order. Meanwhile, in the political sphere, it was essential to conclude the peace treaties and stabilise international relations. Although the League of Nations was formally dissolved (July 31) nothing in the events of 1947 suggested that its successor, the United Nations, had any substantial prospect of realising the dreams of promoting univer-

sal peace on which the League had been founded after the First World War. A common policy of the Great Powers, which was its condition precedent, grew steadily more improbable, and consequently the proceedings of the Security Council and the Assembly (see UNITED NATIONS, CHARTER OF THE) were generally felt to be far less significant for the dominant issues than the meetings, albeit inconclusive, between the representatives of the United States, and those of Great Britain, Russia, and France. Unhappily, as the year wore on, Russia became progressively more and more flagrantly ranged in opposition to the other three. This intransigence of Russia was, in fact, the decisive feature of European hist. after the war. The signing of peace treaties with Italy, and the lesser European satellites of Ger., did little to solve the deadlock. The Soviet Union concentrated on consolidating its relations with and influence over all nations—except Greece and Turkey—E. of the line of div. estab. at the time of the Ger. surrender. Under Russian influence all these countries were now ruled by single-party totalitarian régimes, and the leaders of opposition were exiled or, in some cases, judicially murdered—e.g. M. Petkov, leader of the opposition in Bulgaria, was sentenced to death on Sept. 16 and, despite urgent representations by the W. allies, hanged on Sept. 23. In fact, all opposition to Russian-inspired policy (see RUSSIA—History) was inexorably crushed. Rigid control of communications prevented Western E. from learning very much of what was happening behind the so-called 'Iron curtain', while those within the Soviet Union were yet more ignorant of the conditions of the W. This system was consolidated by the estab. of a 'Communist Information Bureau' in Belgrade, which was doubtless merely the revival of the former 'Comintern' (see under ANTI-COMINTERN PACT), dissolved during the war, under a new name ('Cominform'). In Western E. a fierce struggle for power raged between the Communist parties, largely following the direction of Russian policy, and other political groups. The background to the conflict was the economic misery and chaos of a continent threatened with starvation and bankruptcy.

Marshall Plan—Russian Counter-moves.—It was evident that nothing could avert these evils from befalling in the not very distant future, and, at the same time, offer a prospect of ultimate recovery to European autarchy except the importation of vast supplies from the New World. Accordingly Mr. George Marshall (h.c.), the secretary of state, in a speech at Harvard (June 5) outlined his plan to come to the rescue of E. with financial help on a gigantic scale. The condition of assistance was that the European nations should meet and submit a combined statement of their needs and that the aid would be granted only for recovery and as part of a system of mutual aid; but when a conference with this object assembled in Paris, the Soviet Union per-

sued their satellite states not to participate. They declared that the purpose of the United States was to subject E. to Amer. imperialism. The Western peoples (16 nations) submitted their proposals in a general report giving details of a four-year programme of reconstruction and at the end of the year the United States Gov. recommended to Congress the provision of credits reaching the enormous figure of 17,000 million dollars. But even before this historic recommendation the Amer. Gov. had given help to E. For the Truman doctrine of granting aid to countries threatened by aggression was formulated when the need to reduce Brit. commitments abroad left Greece and Turkey exposed to acts of aggression by Russia and her satellites. President Truman's request for 400 million dollars of relief and military supplies for those Balkan countries was granted after protracted debate and only following Senator Vandenberg's (*q.v.*) amendment pledging Amer. withdrawal if the United Nations should request it. Also at a special session of Congress a Bill was passed for W. aid to France, Italy, and Austria (as well as to China). Hostility to communism induced Congress to pass the bill without much difficulty. Yet the same antipathy did not provide a much stiffer struggle when Congress came to consider the totals and credits of long-term aid to E.

In every aspect the political and still more the economic instability of E. was intimately related to the uncertainty over the place that Germany was eventually to take in the Continental system. The foreign ministers of the prin. Allies met in Moscow in the spring to discuss in broad outline the terms of an agreement on which a peace treaty might be founded; but six weeks of argument only served to widen the difference of outlook between the W. Powers and Russia. Agreement was prevented not so much by the inherent difficulties of the German (and Austrian) problems themselves as by the overshadowing ideological forces implicit in Russian foreign policy generally, and the political trials in Eastern E. and the emergence of the 'Cominform', together with the intensified Soviet propaganda, only served to harden W. democratic opinion and to predispose their govts. against making concessions. In Germany little now remained of the Potsdam provisions after the Brit. and Amer. govts. forced to counteract the exclusive policy in the Soviet zone, formed their own economic State out of their combined zones. In answer to the Marshall plan, the Soviet Union made it evident that it would do all in its power to make it ineffective and, by necessary inference, would press for four-Power control of the Ruhr. France, in the meantime, put forward schemes for detaching the Ruhr, Rhineland, and Saar from Germany; Britain and the United States supported that plan for the Saar, but were opposed to the separation of the Ruhr and Rhineland. In reply to Russia's demand for international control over the Ruhr industries, Mr. Bevin (Britain) bluntly re-

fused to agree to any Four-Power interference in the Ruhr while the E. zone of Germany remained in effect a 'closed shop.' It was under these unpromising auspices and in an atmosphere of mutual suspicion that the London conference met in Nov. to renew discussions of a Treaty basis. It was not surprising, therefore, that no agreement could be reached upon the reconstitution of a Ger. gov. with which a treaty might be concluded, for the sufficient reason that the Soviet conceived such a gov. in terms of totalitarian communism and the W. Powers in terms of compromise between parties representative of the various shades of Ger. opinion. The Russians persisted in their claim (see RUSSIA.—*History*) to take large amounts from current Ger. production as 'reparations'; the W. allies, who were heavily subsidising the economy of their zones in order to ward off starvation, held that such 'reparations' were in effect being paid by them; and on that issue the London conference broke down without any arrangement to meet again, thereby leaving the world uneasily conscious that forces were being arrayed on either side of a gulf which, unless bridged in the immediate future, might well contain the seeds of a third world war.

The 'Cold War' between the Western Powers and Russia—The 'Western Union.'

—The hist. of E. in 1948 is the hist. of the struggle between Russia and the W. world, when the div. between E. and W. became more sharply defined, with both sides in the 'cold war' endeavouring to consolidate the forces under their control. The failure of the Four-Power conference on Germany at the end of 1947 had made the div. of E. inevitable and from that moment the W. Powers had no option but to carry out their own plans for the recovery of Germany in their zones and to organise a W. bloc as an answer to the E. bloc which had already been formed under the leadership of Russia. In the House of Commons (Jan. 22) Mr. Ernest Bevin, Brit. foreign minister, put forward the idea of a 'Western Union' or voluntary association of the govts. of Britain, France, and the three 'Benelux' (*q.v.*) countries to deal with practical economic and military problems. His declaration that talks on the a lines had already begun roused interest and support in Canada and the United States, as well as in western E. It also provoked Russia to consolidate the countries of eastern E. in a solid Communist bloc.

Russian Coup d'Etat in Prague—Treaty of Brussels.—The Czech communist party, openly supported by Russia, carried out a *coup d'etat* in Prague as the result of which a Communist-dominated gov. took office and civil liberties were destroyed. This, however, was only one of a series of moves designed to impose greater discipline on Russia's satellite states, in each of which the dissolution of the former democratic parties was expedited and new orders issued for the socialisation of industry and the land. In only two of these states, Yugoslavia and Poland, were serious difficulties encoun-

tered. But while, later, the Polish communist party bowed to the 'loyal' or 'Russian' faction of the party, Marshal Tito refused to submit and boldly maintained his position, Yugoslavia being expelled from the Cominform (q.v.). The *coup d'état* in Prague was widely condemned in the W. world as an act of aggression as brutal as that of Hitler in 1938, and, on March 4, the Brit., Fr., and Benelux Govs. representatives met in Brussels to form a W. Union and, on March 17, the treaty of Brussels (q.v.) was signed, pledging the signatories to close co-operation in economic matters and to give immediate military assistance if any of them should be the object of armed attack in E. The five govts. also agreed to set up a permanent consultative Council to meet in London. The treaty was welcomed by the Canadian Gov. and by President Truman and, in June, the Amer. Senate adopted a resolution presented by Senator Vandenberg (q.v.) urging the association of the U.S. with regional defence agreements, though this resolution was in no sense a treaty. No such constitutional difficulties, however, handicapped the steady progress of the European recovery programme, which had been made possible by Mr. Marshall's offer of aid the previous year, and on April 3 President Truman signed the Foreign Assistance Act authorising aid to E. for one year. When this Act was signed the sixteen European nations which had accepted the Marshall offer met again in Paris to set up a joint Organisation for European Economic Co-operation (O.E.E.C.) which was intended to outlive the European Recovery Programme.

Control of the Ruhr—Currency Reform in Germany—Blockade of Berlin.—Meanwhile the problem of Germany—and to a lesser extent of Austria—became more urgent and menacing. In Feb. the Brit., Fr. and U.S. Govs. began discussions in London about the future of the three W. zones of Germany. These discussions, in which the Benelux countries later joined, finally resulted in a Six-Power Agreement which was pub. on June 7 providing for international control of the Ruhr, Germany's representation in the European Recovery Programme and the association of the Benelux countries in policy relating to Germany. It also provided for the election of a provisional Ger. Gov. in the W. zones 'until the eventual estab. of German unity.' Russia immediately countered with a conference of Eastern European states at Warsaw, which condemned the agreement as a plan to divide Germany and proposed instead Four-Power control of the Ruhr, the creation of a 'democratic' gov. for all Germany and the withdrawal of all occupation forces within a year of the conclusion of a peace treaty. Before the Warsaw conference met the three W. Powers had announced (June 18) a drastic currency reform to apply to their zones of Germany, but not to Berlin, and the Reichsmark was superseded by a new Deutsche Mark. The Russian authorities then issued an order banning passenger

trains, motor and pedestrian traffic between their zone and the W. and, on June 19, the blockade of Berlin began—the W. Powers imposing restrictions on trade as a countermove. The real objection of the Russians was not so much to the currency reform as to the whole plan for economic recovery in the W. zones and, above all, to the proposal to form a provisional gov. in W. Germany. The blockade of Berlin was a deliberate attempt to force the W. Powers either to abandon their plan for W. Germany or to leave Berlin. From the beginning of the dispute the W. Powers were prepared to accept the currency in the Russian zone as the currency for Berlin provided that its issue was made under the control of the Four-Power Kommandatura of the city. The Russians rejected this offer and announced that they would introduce a new currency to cover the whole of Berlin independently. On June 23, therefore, the W. Powers introduced the new Deutsche Mark into the W. sectors of Berlin. The Russian blockade was at once intensified and a critical position arose. Unable to supply the pop. of their sectors with food and other supplies by road or rail the W. Powers arranged to supply them by air. The success of this 'air lift,' which surprised the Russians as much as it seized the imagination of the Ger. people, made it possible for the W. Powers to consider the situation more calmly. They presented Notes to the Russian Gov. protesting against the blockade, but offering to discuss outstanding questions once the blockade was lifted. On Aug. 30 agreement with Russia was reached in principle and a joint directive sent to the military commanders in Berlin laying down that all restrictions on trade would be lifted and the Soviet mark would be introduced as the sole currency for Berlin as soon as the military commanders agreed on the details of currency control. The commanders, however, failed to agree and further conversations in Moscow proving abortive, the W. Powers informed (Sept. 26) the Russian Gov. that they were obliged to refer the matter to the Security Council of the United Nations. But the debates in the Security Council, which met in Paris, had no better result and the blockade continued.

Berlin City Council elections.—In the summer the Russian military authorities began to show their determination to make Berlin a part of the Russian zone by organising riots in the streets, which forced the democratic assembly to seek refuge in the Brit. sector. These tactics were stimulated by the knowledge that elections for a new city assembly were due to be held on Dec. 5—elections which were certain to confirm the preference of a great majority of the Berliners for democracy and the W. to Communism and Russia. The Russians, therefore, forbade elections in their sector, but, being unable to prevent them in the W. sectors, announced beforehand that they would not recognise the result and urged their Communist followers to set up a new *magistrat* or city council in the Russian sector. In this

manner the final div. of the city, long threatened, was accomplished (Nov. 30). While the blockade continued, the W. Powers were forced to concentrate on restoring the W. zones to a state of political and economic health and in this they were helped by the success of their currency reform which so stimulated Ger. production that by the end of 1948 the output of coal, steel and consumer goods was approaching the 1936 level. At the same time events in Berlin demonstrated to the Ger. political parties that their best course was to accept the div. of Germany and co-operate with the W. Powers in forming a provisional gov. A constituent assembly met at Bonn on Sept. 1 to adopt a constitution or basic law. The W. Powers then turned their attention to the question of the future of the Ruhr and, on the eve of a conference in London in Nov., called to set up an international authority for the Ruhr, the Brit. and Amer. military commanders in Germany announced that the coal and steel industries would be handed back to Ger. trustees under allied supervision until a Ger. gov., elected by the people, could decide their future ownership. France, to whom Germany's recovery and the prospect of a Ger. gov. in the spring of 1949 were not altogether agreeable, forcibly protested at this proposal. The result of the Berlin magistrat elections in the W. sectors was announced on Dec. 6 as follows: Social Democrats, 858,100 votes or 64.4 per cent; Christian Democrats, 258,496 or 19.4 per cent; Liberal Democrats, 214,224 or 16.1 per cent. (comparable figures for 1946 for the whole city were: 909,170 votes or 48.7 per cent, 454,202 or 22.1 per cent, 192,527 or 9.4 per cent respectively; and 405,992 votes or 19.8 per cent for the Social Unity party, who were not represented in the 1948 elections). In view of the installation of a new Soviet-sponsored Magistrat at the Neues Stadthaus, the W. liaison officers were withdrawn from that building on Dec. 1 when it was also announced that the legally-elected city assembly and the legitimate Magistrat would be accommodated in the W. sectors. The city assembly repudiated the Soviet-sponsored magistrat, proclaimed a 'state of political emergency' in Berlin and passed a unanimous vote of confidence in the W. magistrat.

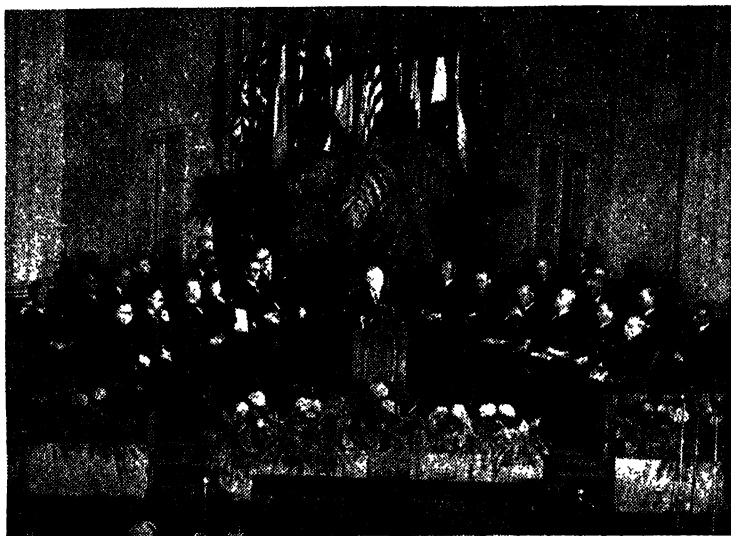
Statute of the Ruhr.—Arising out of a Six-Power conference of the W. Gov. concluded on Dec. 28, the agreed draft text of the Statute of the Ruhr Authority was pub. on that date. The Statute provided for an international authority for the Ruhr, the members of the authority being the signatory govts. and Germany. The authority consists of a council composed of representatives of the signatory govts., assisted by a secretariat headed by an executive secretary appointed by the council. When a Ger. gov. is estab. it may appoint a delegate to the authority with the right to attend meetings of the council. The chief function of the authority is to make a div. of coal, coke and steel from the Ruhr as between Ger. consumption and export.

European Recovery Programme—On July 25, 1948, Mr. Paul Hoffman, administrator of the European Recovery Programme at a meeting of the O.E.E.C. and of delegates of the W. zones of Germany at Paris called for 'a master plan of action' by which nations could achieve full economic recovery by June 30, 1952, when aid by the U.S.A. was due to end. On Sept. 11 the council of the O.E.E.C. reached provisional agreement on both the distribution of Amer. aid contributions and drawing rights in the intra-European payments scheme for the year July 1, 1948–June 30, 1949. Under the terms of the European Economic Co-operation Act (U.S.A.) the agreement was subject to approval by Mr. Paul Hoffman. The distribution of the total aid for 1948–49 of \$4,875 m. among the participating countries was as follows: Austria \$217 m. (£54,250,000); Belgium Luxembourg \$250 m. (£62,500,000); Denmark \$110 m. (£27,500,000); France \$989 m. (£247,250,000); Greece \$146 m. (£36,500,000); Ireland (Eire) \$79 m. (£19,750,000); Iceland \$11 m. (£2,750,000); Italy \$601 m. (£150,250,000); Netherlands \$496 m. (£120,000,000), including \$21 m. for Indonesia); Norway \$84 m. (£21,000,000); United Kingdom \$1263 m. (£315,750,000); Sweden \$47 m. (£11,750,000); Trieste \$18 m. (£4,500,000); Turkey \$50 m. (£12,500,000); Bizone (Western Germany excluding Fr. zone), \$114 m. (£103,500,000); Fr. zone (Germany) \$100 m. (£25,000,000). (Switzerland and Portugal did not apply for aid and are therefore not included.) On Oct. 17 a European recovery plan for the year July 1, 1948–June 30, 1949) to be carried out with the estimated Marshall aid of \$4,875 m. (£1219 m.) was handed over to Mr. Averell Harriman, special representative in E. of the Amer. Economic Co-operation Administration, on behalf of the O.E.E.C. There was also signed on that date an agreement on intra-European payments under which the drawing rights of debtor on creditor countries totalled \$810,400,000. The main features of this twelve months' programme were: a marked increase in the production of agric. and industrial goods; a considerable increase in trade between member countries, making it possible for them to meet a much larger part of their essential requirements from their own resources; an improvement in the supply of basic consumer goods to the pops. of member countries, with a consequent improvement in the standard of living; the limitation, with a few exceptions, of imports paid for in dollars to those goods which are essential for the recovery programme; and an increased production of machinery which in subsequent periods will lead to higher all-round output in member countries. The report of the O.E.E.C. on the economic programmes of its member nations for the year beginning June 30, 1948, showed that the estimated dollar aid required was \$4,317 m. Imports from the dollar area for that period were reckoned at \$6,326 m., as against \$6340 m. for 1948–49, exports from the nineteen

Marshall aid countries to the dollar area were expected to show an increase of 25 per cent and total exports from those countries; an increase of 18 per cent.

Council of Europe.—The Consultative Council of the W. Union, consisting of the foreign ministers of the five W. Powers met in London on Jan. 27-28 when they agreed on the creation of a Council of E. consisting of a ministerial committee meeting in private and a consultative body

North Atlantic Pact. Meanwhile negotiations had been in progress for the conclusion of a N. Atlantic Pact in which the United States of America should be associated with Western E. in security arrangements. The draft pact or treaty was completed in March 1949. Its principal Article (V.) recognised that any aggression against one of the signatories would be considered as an aggression against all. In these circumstances immediate action



New York Times Photos

THE SIGNING OF THE NORTH ATLANTIC TREATY, APRIL 4, 1949

President Truman addresses the group before the signing of the pact. Seated in the inner semi-circle, left to right, are the representatives of the twelve signatories: Ernest Bevin, United Kingdom; Halvard Lange, Norway; Joseph Bech, Luxembourg; Bjarni Benediktsson, Iceland; Gustav Rasmussen, Denmark; Paul Henri Spaak, Belgium; Dean Acheson, United States; Lester B. Pearson, Canada; Robert Schumann, France; Count Carlo Sforza, Italy; Dirk U. Stikker, Netherlands; Jose Caeiro Da Matta, Portugal. Behind the foreign secretaries of the signatory nations are their ambassadors to the U.S.A.

meeting in public. The Council decided to invite other European countries to take part in negotiations for the estab. of the Council of E. This proposal was a compromise between the Brit. and the Fr. Benelux views and an acceptance of the general principle that each gov. would adopt a system suited to its own constitutional practices, which meant that the Brit. delegation would be appointed by the gov. and the other delegations would be elected by their parliaments. The defence organisation of the W. Union countries took shape when the Defence Ministers of the five powers met in Paris (Sept. 1948). The nucleus of a command was set up with Field-Marshal Lord Montgomery as the permanent chairman.

against aggression, either individually or collectively, and by armed forces, is contemplated by the pact. Aggression is defined (Article VI.) as any attack against the ter. of the contracting parties, against their occupation forces outside their ter., against their ships or aircraft in flight in the region bounded to the S. by the Tropic of Cancer (the three Metropolitan depts. of Fr. N. Africa are included in this security area). Article VII. recognises the supreme authority of the Security Council of the United Nations for the maintenance or re-estab. of peace and security or, in other words, the pact is to be considered as a defensive measure, whose existence in no way crosses the authority of the United Nations. Simi-

larly, Article VIII. recognises the validity of previous engagements entered into by the signatories, such as the Franco-Soviet treaty or Anglo-Soviet treaty. The Pact was signed on April 4, 1949, by the United States, Canada, Great Britain, France, Belgium, Holland and Luxembourg. Norway, Italy and Denmark were invited to adhere later, and, in a still later stage, Portugal and Iceland.

Bibliography: SOCIOLOGICAL AND ETHNOGRAPHICAL: J. Gellie, *Prehistoric Europe*, 1880; R. Munro, *Lake Dwellings of Europe*, 1890; W. Z. Ripley, *Races of Europe*, 1899; Freeman, *Historical Geography of Europe*, 1903; V. Gordon Childe, *The Dawn of European Civilisation*, 1925, and *The Danube in Prehistory*, 1928; K. H. F. Guenther, *The Racial Elements in European History*, 1927; I. Bowman, *The New World*, 1928; C. Dawson, *The Making of Europe*, 1932; *European Civilisation* (ed. E. Eyre), 7 vols., 1934-39; J. W. Thomson and others, *European Civilisation*, 1940.

HISTORY: E. Gibbon, *History of the Decline and Fall of the Roman Empire*, 1776-88; H. Hallam, *Europe in the Middle Ages*, 1872; E. Lavisse and A. Rambaud (ed.), *Histoire générale du IV^e siècle à nos jours* (12 vols.), 1894-1902; T. Lindner, *Weltgeschichte* (8 vols.), 1901-1914; *The Cambridge Modern History*, 1902-11; *The Cambridge Medieval History*, 1911-36; *The Cambridge Ancient History* (12 vols.), 1923-39; J. Bryce, *Holy Roman Empire*, 1869, 1904; T. H. Dyer, *History of Modern Europe*, 1453-1871, 1901-07; Sir C. Oman, *The Outbreak of the War*, 1919; C. J. H. Hayes, *Brief History of the Great War*, 1920; L. Thorndike, *History of Medieval Europe*, 1920; H. M. V. Temperley, *History of the Peace Conference*, 1920-24; G. B. Gooch, *History of Modern Europe 1878-1919*, 1923; A. J. Toynbee and others, *Survey of International Affairs* (18 vols. covering events from 1925 to 1938 inclusive), 1927-1941; Ramsay Muir, *Expansion of Europe*, 1925; W. C. Abbott, *Expansion of Europe: a social and political history of the modern world, 1415-1789*, 1925; C. Seignobos, *Histoire politique de l'Europe contemporaine* (2 vols. dealing with the hundred years 1814-1914), (7th revised ed.), 1925-26; J. Holland Rose, *Development of European Nations*, 1926; D. B. Horn, *History of Europe*, 1927; R. B. Mowat, *History of European Diplomacy*, 1927; F. Alexander, *From Paris to Locarno and After*, 1928; R. L. Buell, *Europe: a History of Ten Years*, 1928; M. W. Graham, *New Governments of Eastern Europe*, 1928; Edward Grey (of Faldoon), *Twenty-five Years*, 1928; C. Dillie Burns, *A Short History of the World, 1918-1928*, 1928; J. W. Wheeler-Bennett, *Information on the Renunciation of War*, 1928, and *Documents on International Affairs*, 1929; I. A. L. Plunkett, *History of Europe*, 1929; G. P. Gooch, *Recent Revelations in European Diplomacy*, 1930, and *Studies in Diplomacy and Statecraft* (background of contemporary world events, with summary of British foreign policy), 1943; E. Herriot,

The United States of Europe, 1930; Leon Trotsky, *The History of the Russian Revolution* (3 vols.), 1933; B. Croce, *Europe in the Nineteenth Century*, 1934; H. Pirenne, *Histoire l'Europe*, 1936; H. A. L. Fisher, *History of Europe*, 1938; R. Flenley, *Makers of Nineteenth-century Europe*, 1940; *The Cambridge Economic History of Europe from the Decline of the Roman Empire* (vol. 1), 1941; G. A. Gathorne-Hardy, *A Short History of International Affairs, 1920 to 1929* (3rd revised ed.), 1942; A. J. Whyte, *The Evolution of Modern Italy, 1715-1920*, 1944; J. Bowle, *The Unity of European History*, 1948.

THE SECOND WORLD WAR: E. McNinis, *The War* 6 vols.), 1940-45; Monica Curtis (ed.), *Norway and the War* (documentary record of the invasion and subjugation of Norway), 1941; I. Erenburg, *The Fall of Paris*, 1942, and *Russia at War*, 1943; *The Campaign in Greece and Crete*, H.M.S.O., 1942; *Conditions in Occupied Territories* (reports issued by the Inter-allied Information Committee, London), H.M.S.O., 1942; H. Rauschnig, *Makers of Destruction* (the aims and beliefs of the men behind Hitler), 1942; W. S. Churchill, *The Unrelenting Struggle* (speeches), 1942, and *The Second World War* (in course of pub.); C. Reiss, *Underground Europe*, 1913; S. Segal, *Nazi Rule in Poland*, 1943; J. Lorraine, *Behind the Battle of France* (documentary account of Vichy foreign policy), 1943; *Report by the Supreme Commander to the Combined Chiefs of Staff on the Operations in Europe of the Allied Expeditionary Force, June 6, 1944, to May 8, 1945*, H.M.S.O., 1946; P. Badoglio, *L'Italia nella seconda guerra mondiale*, 1946; Viscount Montgomery, *Normandy to the Baltic*, 1947, and *El Alamein to the River Sangro*, 1948; L. M. Chassin, *Histoire Militaire de la Seconde Guerre Mondiale*, 1939-45, 1947; A. Harris, *Bomber Offensive*, 1947; M. Shulman, *Defeat in the West*, 1947; C. Falls, *The Second World War: a Short History*, 1948; D. D. Eisenhower, *Crusade in Europe*, 1949.

European Corn Borer (*Pyrausta nubilalis*), moth, comparatively harmless to crops in Europe, where it has long been known, but regarded as a serious menace in the U.S.A. It made its first appearance on the E. coast of America in 1917, having been carried in presumably on Eng. vessels, and since then has penetrated further W. It has chiefly attacked Indian corn, where its ravages have threatened the future of the whole crop. The alarm of agriculturists during 1926 led to the sum of ten million dollars being granted by Congress to fight the invader, and two lines of defence have since been adopted with some promise of success. One of these is the importation of parasites that prey upon the moth, and the other consists in thoroughly cleaning up the fields after an Indian corn harvest, and destroying all stalks and vegetable refuse with fire, in order to prevent further breeding of the moths.

Europium, chemical element discovered by Demarcay in 1896. It belongs to the group of rare earths. Its symbol is Eu,

its atomic weight 152, and its atomic number 63. Eurcptom oxide is a pale powder.

Eurotas, one of the chief rivs. of the auct. Peloponnesus, in Greece, now named Morea. Its course is not more than 50 m., flowing through Laconia to the gulf of Gythion.

Euryale ferox, species and genus of Nymphaeaceae, is an elegant aquatic plant which inhabits the lakes of the E. Indies and China.

Eurydice: (1) In Gk. legend, wife of Orpheus. She was bitten by a serpent while fleeing from Aristaeus. Orpheus descended to Hades after her, and by his exquisite music persuaded Pluto to allow her to return with him to the upper world. The condition that Orpheus should not once look behind him being broken, his 'half-regained Eurydice' was snatched from him again. This legend has been the subject of many pictures, including one by Watts. Copies of a Gk. relief (end of fifth century B.C.) are at Rome, Naples, and Paris. See Virgil, *Georgics*, iv.; Ovid, *Metam.* x. 1. (2) Illyrian princess, wife of Amyntas II. of Macedonia, mother of Philip II. of Macedonia (339-336 B.C.) and Perdiccas III. See Justin, vii. 4, 5. (3) Relative of Philip, in whom numerous political intrigues centred over the succession on the death of Alexander the Great (323 B.C.).

Eurymedon, in auct. geography, riv. of Pamphylia, Asia Minor. At its mouth the Athenian commander Cimon signally defeated the Persians in 466 B.C. Its modern name is Kopru-Su.

Eurynome, genus of decapod brachyurous crustaceans, which belongs to the family Midae, the species are known as spider-crabs. *E. aspera* inhabits the Mediterranean.

Eurypharynx, see PELICAN FISH.

Eurytheus, see HERCULES.

Eusebius of Emesa (c. 295-c. 360 A.D.), Gk. ecclesiastic, b. at Emesa. He refused the offer of the see of Alexandria, being averse from all theological disputes; but he accepted the small bishopric of Emesa, in Phoenicia, instead. He was, however, driven from this, as his powers as mathematician and philosopher resulted in his flock accusing him of sorcery. Only a few fragments of his works are extant.

Eusebius of Nicomedia (d. c. 312), Gk. bishop and theologian, related on the maternal side to the Emperor Julian, whose early tutor he was. Like Eusebius of Caesarea, he was a defender of Arius, and placed himself at the head of the Arian party after the Council of Nicea. The Emperor Constantine was baptised by him in 337, and two years later he was promoted to the see of Constantinople.

Eusebius Pamphili of Caesarea (c. 284-c. 349 A.D.), the 'father' of eccles. hist., probably b. in Palestine. His name, Pamphili, was assumed after the martyrdom of his instructor, Saint Pamphilus. About 313 he became Bishop of Caesarea and took a prominent part in the Council of Nicea, where he was the leader of the temporising or semi-Arian party, which, opposed to discussing the nature of the

Trinity, would have preferred the language of Scripture to that of the theology in referring to the Godhead. He has the reputation of being the most learned father of the church, after Origen and Jerome; and Constantine, who appreciated his moderation and other good qualities, said that he was fit to be the bishop of practically all the world. He wrote two treatises which have come down to us, the *Preparation* (*Preparatio Evangelica*) and the *Demonstration* (*Demonstratio Evangelica*) of the Gospel, two apologetic works, and many other writings of the highest value, the chief of which are: *The History of the Church, from the Time of its Founder to the Year 323*, and the *Chronicon*, a hist. of the world down to 328, valuable as containing extracts from many auct. writers whose works are no longer extant. Some of the most informative passages in his *History* are those on the written liturgy and primitive ritual; on the Ignatian Epistles; on the persecutions of Diocletian and Trajan, and on the Thundering Legion. Writings of less importance are: *The Martyrs of Palestine*, treatises against Hierocles and Marcellus, the *Theophania* (discovered in 1839), and a panegyric *Life of Constantine*. The first ed. of all E's works was pub. in 1512 at Basle; the best modern one is that of E. Schwartz and T. Mommsen (1903-09). Among the many eds. of the *Church History* are those by Heinichen, 3 vols. (1865-70), containing also the *Life of Constantine* and the *Oration in Praise of Constantine*; and that by E. Burton (1838). Accounts of Eusebius and his opinions will be found in J. Herzog's *Encyclopaedia*, 1954; I. Dorner's *History of the Person of Christ*, (ii) 1839; P. Schaaf's *Church History* (ii) 1867; Introduction to Lee's trans. of the *Theophania*; and in various chapters of J. J. Blunt's *The Christian Church during the first three centuries* (1888). See also trans. by Kirsopp Lake and J. E. Oulton, 1926-1932, and by H. Lawlor and J. E. Oulton, 1927-28.

Euskera, see under BASQUES.

Euskirchen, Ger. tn. in the Rhineland, Germany, at the junction of railways running S. from Cologne and W. from Bonn. Its pre-1939 industries included cloth, metalware factories, and iron foundries. The church of St. Martin dates from the thirteenth and the tn. hall, partly destroyed in the Second World War, from the fourteenth century. E. figured in the Anglo-Amer. advance to the Rhine in Feb. 1915 as a vital road-centre. Its capture, with that of Prüm, led to breaching the Siegfried Line in this region and eventually to the seizure of the bridgehead at Remagen. Pop. 15,000.

Euspongia, see SPONGE.

Eustachian Tube (after Bartolomaeo Eustachio), cylindrical tube lined with mucous membrane, dilated at both ends and connecting the cavity of the middle ear with the pharynx, to which it passes downwards, forwards, and inwards, for a distance of about 1½ in. It is partly osseous, but chiefly cartilaginous. Sound vibrations acting on the *tymppanic mem-*

brane and the *fenestra ovalis* cause constant changes of pressure in the middle ear, which changes are equalised by means of this tube. It is open during rest, but closed during deglutition. Permanent occlusion of this tube is one of the most common forms of deafness. See EAR.

Eustachian Valve, after Eustachio, the attachment which in the fetus directs the blood from the inferior vena cava through the foramen ovale into the left auricle. Its remains will be found attached to the right and lower margins of the opening of the inferior vena cava.

Eustachio, Bartolommeo (c. 1500-74), It. physician and anatomist, b. at Severino. He is celebrated for his discovery of the Eustachian tube (*q.v.*). Anatomical science was greatly enriched by his researches. He also discovered the rudimentary valve of the heart. E. was physician-in-ordinary to the popes and prof. of medicine in Rome, where he died. His chief works are the *Opuscula Anatomica* (1564) and *Tabulae Anatomice*, pub. in 1714.

Eustathius (d. c. 1193), celebrated Gk. scholar, b. at Constantinople. He first became a monk and afterwards a deacon and teacher of rhetoric in his native city. In 1160 he became archbishop of Thessalonica and subsequently of Myra. E. was a man of great learning, and was deeply versed in the anc. classic authors. His commentary on Homer (1st ed. Rome, 1542-50) is his prin. work. Some letters and theological and historical treatises were first pub. by Tafel in 1832.

Eutaw Springs, near Eutawville, in S. Carolina, U.S.A. The springs originate at the foot of a hill, and spread into a large stream which disappears underground to appear again further on. The last battle of the War of Independence was fought here 1781.

Eutectic, name which was given by Frederick Guthrie, a scientific writer, to those mixtures in which the components are in such proportions as to solidify on cooling, after melting, at one temp. like a pure substance. This temp. which is called the E. point, is the lowest freezing temp. of any mixture of the components. E. mixtures play an important part in the constitution of alloys, the heterogeneous structure of which may be demonstrated by the uneven action of etching agents.

Euterpe, genus of tropical spineless palm is found largely in the forests of S. America. There are sev. species; *E. edulis*, the Assai or cabbage palm, produces a bud which is eaten as food, a fruit from which oil is obtained, and wood used for building purposes.

Euterpe, in anc. Gk. mythology, is one of the nine goddesses who presided over the different departments of literature. E. was the muse of lyrical poetry, and is represented with the double flute.

Euthanasia, administration of pain-relieving mediums or, in certain circumstances, narcotics to those who are dying. The term is also applied to the painless killing of human beings who are suffering from mental or physical disease that is thought to be incurable. It is not legal, but is practised, and the pros and cons

have been the subject of much controversy. The Rom. Catholic Church has specially been against it as an unwarrantable interference with the processes of life and death of the individual.

Eutheria (Gk. *εὐ*, well, and *θηρίον*, an animal), term given to a sub-order of mammals (*q.v.*) comprising all but the marsupials and monotremes, first applied by Gill in 1872. It is a synonym of Monodelphia and Placentalia.

Eutocius (c. A.D. 550), Gk. mathematician and geometer of Ascalon, in Palestine, and pupil of the architect Isidorus. He is noted for his *Commentaries on Apollonius of Perga* and *Archimedes*, four of which are extant, including comments on Archimedes' *Treatise on the Sphere and Cylinder*. E. discusses the problem of the duplication of the cube and gives sev. solutions.

Eutropius, Flavius (d. c. A.D. 370), Rom. historian of the fourth century. He was secretary to the emperors Constantine and Julian, accompanying the latter on his Parthian expedition. He probably rose to high office in the state, possibly that of senator or consul. He wrote *Breriarum Itorum Romanorum ab urbe condita*, a concise hist. down to the death of Jovian, A.D. 364. The best eds. are those of Grosse, 1813; W. Hartel, 1872; and H. Droysen, 1879. See Suidas, *Eutropius*; Moller, *Dissertatio de Eutropio*, 1685; Duncker, *De Paganis Eutropii Interpretis*, 1880; Germadius, *De Viris Illustribus*; D. Pastorino, *Eutropius*, 1926.

Eutyches, founder of the Eutychian heresy, which said that after the incarnation Christ had but one nature, the human nature being absorbed in the divine nature. The cause of E., however, was somewhat favoured at Alexandria, where Cyril had taught a less-developed form of the same doctrine, and owing to the influence of Dioscurus of Alexandria, a fresh council was held at Ephesus. To this period belongs Pope Leo's famous treatise on the two natures of Christ in the Incarnation. E. was restored by the 'Robber Council' of Ephesus (449), but this decree was reversed at Chalcedon (451). After this, the heretic disappears from hist., and the sect was put under penal laws.

Euxine, see BLACK SEA.

Evagoras, King of Salamis in Cyprus from c. 410-374 B.C., a descendant of Teucer, Telamon's son. The Athenians and Egyptians aided him in his long wars with the Persians, ending with a peace in 376 (see Xen., *Hell.* ii. 1). He was assassinated, and succeeded by his son, Nicoteles. An oration of Isocrates praising E. is still extant. Evagoras II. succeeded Nicoteles, and was dethroned by Protagoras.

Evagrius (c. 536-594), surnamed 'Scholasticus,' of Antioch, Syrian church historian, who wrote a *Church History* (from A.D. 431-594), a continuation of the work of Kueobius (see ed. of J. Bidez and L. Parmentier, 1898). He also trans. *Athanasius' Life of St. Anthony* into Lat.

Ewald, Johannes, see KWALD, JOHANNYS.

Evander, in classic legend, Gk. hero, son of Hermes. About sixty years before

the Trojan War he led an Arcadian colony to Latium, founding Pallantium (later the Palatine Hill). He was supposed to have taught the inhabs. various arts and the worship of sev. Arcadian gods, particularly of Pan (Faunus). He was worshipped among the heroes of Rome on the Aventine. E. was father of Pallas, and ally of Æneas against Turnus in Virgil's story (see *Æneid*, viii., x., xi.). Consult H. Nettleship, *Lectures and Essays*, 1895.

Evangelical (εὐαγγελικός, of good tidings, for the Gospel). This term was originally claimed as a right by all Protestants, in that their beliefs were derived entirely from the evangel or Bible. In the course of time, however, its use and meaning have varied greatly. The term has been especially applied to the school which insists on the utter depravity of unregenerate human nature, necessity for conversion, justification of sinners by faith, free offer of the Gospel to all mankind, and the divine inspiration, authority, and sufficiency of Holy Scripture (reserving the right of individual believers to interpret scriptural passages according to their judgment). In the Anglican communion, holders of such beliefs are usually known as 'Low Church.' In Germany the word applies to the United Church as opposed to the Lutheran and Reformed churches, but it is also sometimes assumed by the pietistic party within the Protestant Church. See CHURCH HISTORY.

Evangelical Alliance, voluntary association of Christians of various countries and denominations, first formed in London, 1846, at a conference of 921 clergymen and laymen, representing some fifty sections of the Protestant Church. The idea started in Scotland, as a protest against Popery and Puseyism. Nine points were agreed upon as a basis of the alliance formed by members holding 'the views commonly called evangelical.' Its aims include maintaining religious liberty throughout the world and succouring the persecuted. It held many international meetings. Its chief pub. is a monthly journal, *Evangelical Christendom*. See A. Bonnet, *Lettres sur l'alliance évangélique*, 1847; A. J. Arnold, *History of the Evangelical Alliance*, 1897.

Evangelical Church. This religious body of N. America was founded in E. Pennsylvania by Jacob Albright (Albrecht) in 1800. The rules of gov. and beliefs adopted were very similar to those of the Methodists. Albright was leader of the association till his death in 1808. In 1816 the first ann. conference was called, and in 1818 the present title was first adopted. Internal controversy in 1891 caused a div. and the branch which met at Philadelphia took the name of 'United Evangelical Church.' But by an Enabling Act the two churches were reunited, the new organisation being officially estab. at Detroit in 1902. The church now has a total membership of over a quarter of a million. See Plitt, *Die Albrechtaleute*, 1877.

Evangelical Synod of North America. Religious communion estab. in 1840 at

Gravois Settlement, Missouri. It is strictly evangelical in principle, and its members accept the Reformed and Lutheran doctrinal statements so far as they are in agreement. When not in agreement, the Synod follows the Scriptures and assumes the liberty of conscience prevailing in the Evangelical Church (q.v.). A new constitution was adopted at a great conference in 1927. The organisation has over 1200 pastors, over 350,000 communicants, and over 1200 Sunday schools. In 1932 it owned property of the value of nearly 40 million dollars. Publications: *The Evangelical Herald*; *The Light Bearer*.

Evangelical Union, religious body (also called Morisonians) formed in Scotland, 1843, by the Rev. J. Morison of Kilmarnock and other ministers who had left the United Secession Church. They were joined by ministers from the Congregational Union who held similar views. The chief article of their faith was belief in the universality of the Saviour's atonement. They also believed in the freedom of the human will. By 1896 the Congregational Union absorbed nearly all the churches. See the *Doctrinal Declaration* of the union, 1856; F. Ferguson, *The History of the Evangelical Union*, 1876, and *The Worthies of the Evangelical Union*, 1883.

Evangelist (the bringer of good tidings, preacher of the Gospel), term used in the N.T., signifying an official of the Christian Church, whose chief duties seem to have been those of a missionary and pioneer, carrying the Gospel message to new places and preparing the way for organising work which was to follow. The E. is not permanently connected with any local field of work, nor is he devoted to the usual service of the pastorate, his work is of an itinerant rather than a local nature. Thus Philip of Caesarea and Timothy of Ephesus are called Es. The term was also used in post-apostolic times for those who read and explained the written Gospels in public worship: but though this has continued to be its distinctive meaning, the official name is more often used to-day in its earlier sense and has been transferred to the writers of the four Gospels.

Evans, Sir Arthur John (1851-1941), Eng. archaeologist, b. at Nash Mills, Hertfordshire, eldest son of Sir John E., a wealthy paper-maker and distinguished antiquary. Educated at Harrow, Oxford, and Göttingen. Married the daughter of Freeman, the historian. He made archaeological explorations in Finland, Lapland, Balkans, and Crete. In 1884 he was appointed keeper of the Ashmolean Museum, which he entirely reorganised, leaving it in 1896 without a rival in England outside national collections. His Cretan enterprise, where he discovered the pre-Phœnician script, made him famous and won him academic honours all over Europe. By his discoveries, through excavations at Knossos, where he built himself a villa, he carried further the work of Schliemann, proving, in his *Cretan Pictographs* (1896) and *Further Discoveries of Cretan Script* (1898), that the Mycæan

or Aegean culture did in fact possess a system of writing. His chronological scheme of Aegean archaeology, as set out in his *Essay on the Classification of Minoan Civilization* (1906), has been accepted almost universally. He issued the first part of his *Scripta Minoa* in 1909. But his greatest work is his *The Palace of Minos*—which did not begin to appear till 1921 (completed 1936). It deals with the earlier Minoan periods and is the definitive pub. of his Cretan discoveries. Other works include *Mycenaean Tree and Pillar-Cult* (1901), *Through Liosnia* (1875), ed. and supplemented E. Freeman's *History of Sicily*, vol. iv. (1891). In 1917 he was elected to the Chair of the Soc. of Antiquaries. Extraordinary Prof. of Prehistoric Archaeology, Oxford Univ. President of the British Association, 1916-19.

Evans, Edith Mary (b. 1888), Eng. actress. b. in London. She made her first appearance at King's Hall, Covent Garden (1912), in *Troilus and Cressida*. She has appeared in the plays of Shakespeare and Shaw and in revived Restoration drama—particularly Congreve's *The Way of the World*. Also appeared in Brieux's *Trois Filles de Monsieur Dupont* (1926); *The Lady of the Lamp* (1929); and *The Humours of the Court* (1929). Among her chief successes were *Misses Page*, *Helena* and *Nerissa* in Shakespeare's plays; *Millamant* in Congreve's play; and *Lady Utterwood* in Shaw's *Heartbreak House*, and the She-Ancient in *Back to Methuselah* (1929).

Evans, Sir Edward Radcliffe Garth Russell, first Baron Mountevans (b. 1881), Eng. admiral and explorer. Popularly known as 'Evans of the Broke.' E. was in the S.Y. *Morning*, relief ship in search of Capt. Scott's ship the *Discovery* (1902-1904); was second in command of Scott's expedition to the South Pole and succeeded Scott on his death. In the First World War 1914-18 he commanded a destroyer patrol guarding the Straits of Dover and won fame in 1917 when his destroyer *Broke*, with *Swift*, defeated six Ger. destroyers which had crept through the fog to raid Dover. Commander of H.M.S. *Carlisle*, 1926-27; of the battle-cruiser *Repulse*, 1926-27; rear-admiral in command of the Australian Navy, 1929-1931; commander-in-chief, Africa station, 1933-35; of the Nile, 1935-39. Awarded King Edward VII. and King George V. medals for Antarctic exploration and a score of times decorated for bravery. London Regional Commissioner for Civil Defence, 1939-45. Created 1st Baron Mountevans, 1945. Publications: *Keeping the Seas* (1920), *South with Scott* (1921), and *Adventurous Life* (1946).

Evans, George Essex (1863-1909), Australian poet; b. in London; youngest son of John Evans, Q.C. Educated at Haverfordwest Grammar School and in Guernsey; emigrated in 1881. Edited the *Antipodean annual*, 1892, 1893, and 1897, with assistance from K. L. Stevenson. Poetry: *The Repentance of Magdalené Despar*, and other verses (1891); *Lorraine*, and other verses (1898); the fifty-guinea-prize poem on inauguration

of the Commonwealth (1901); *The Sword of Pain* (1905); *The Secret Key* (1908).

Evans, Sir George de Lacy (1787-1870), Brit. general, b. in Ireland. In 1815 he fought at Waterloo. He also distinguished himself at the siege of Sebastopol and the battle of Inkerman in the Crimean war, for which services he received the thanks of the House of Commons in 1855 and was created G.C.B.

Evans, Marian, see ELIOT, GEORGE.

Evans, Oliver (1755-1819), Amer. mechanist and inventor, b. at Newport, Delaware. He invented a machine for making wire card teeth (1777) used in carding cotton and wool, and is also noted for his improved machinery for flour-mills. E. is said to have invented the first steam engine constructed on the high-pressure system, sending his drawings and specifications to England, 1795. He also made the first steam dredging machine of U.S.A. His project of a railway between New York and Philadelphia failed through lack of funds. E. has been called the 'Watt of America.' He wrote *The Young Millwright's and Miller's Guide* (1795). See R. Thurston, *Growth of the Steam Engine*, 1878.

Evans, Robley Dunglison (1846-1912), Amer. naval officer; appointed to the Naval Academy from Utah in 1860. He was in command of the *Iowa* at the naval battle of Santiago in the Sp.-Amer. War, and was commander of the *Yorktown* at Valparaíso in 1891, where he earned the name of 'Fighting Bob Evans.' In 1901 he was made rear-admiral, and in 1902 commander of the Asiatic fleet. He became commander of the Atlantic fleet in 1905, and in 1907 commander-in-chief of that fleet on tour of the world. *A Sailor's Log*, pub. in 1891, is his work. He retired from public life in 1908.

Evans, William (1811-58), Eng. landscape painter in water-colours, is usually known as 'Evans of Bristol.' A painter of Welsh scenery, one of his finest works is 'Treh Mawr.'

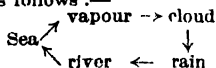
Evansville, beautiful residential city of Cook co., Illinois, U.S.A., 12 m. N.W. of Chicago. It is the seat of the North-Western Univ. of the Methodist Episcopal Church, of the Dearborn Observatory, and of three theological colleges, and the headquarters of the Women's Christian Temperance Union. Pop. 65,300.

Evansville, city in Indiana, U.S.A., a manuf. and commercial city, on the Ohio R. with fine parks and drives. There are many coal mines near and a trade in coal, hardwood lumber, and agric. products; flour, furniture and cigars are manuf. Pop. 97,000. Water power is supplied by a dam in the Ohio R.

Evaporation, or **Vaporisation**, is the process by which a substance changes into the state of vapour. Some solids, such as snow, camphor, iodine, etc., readily disappear in the state of vapour at temps. well below their melting points. The E. of a liquid may go on at all temps., but the rate of change is greater the higher the temp., until the boiling-point (g.e.) is reached, when free E. occurs. The rate at which E. takes place depends (1) on the

area of the surface exposed; (2) on the freedom from vapour of the space above the liquid; and (3) on the nearness of the vapour pressure to the external pressure. Thus, taking a quantity of liquid, it will evaporate most rapidly if placed (1) in a shallow vessel; (2) in a draught, so as to remove the vapour as soon as formed; and (3) if heated, or placed under an exhausted receiver, the vapour pressure being increased in the former case, and in the latter the external pressure reduced. If a quantity of liquid is placed in an evacuated vessel, some of it will evaporate until the space above the liquid is 'saturated' with the vapour; equilibrium is then maintained, or in other words, E. and condensation take place at equal rates. For every temp. there is a maximum vapour pressure, which becomes equal to atmospheric pressure at the boiling-point of the liquid. The presence of another gas or vapour, such as air, has no effect upon the magnitude of the vapour pressure, but merely increases the time taken to arrive at the state of equilibrium. A large amount of heat is absorbed in the process of E., the remaining liquid and its surroundings being cooled, sometimes to a considerable extent. Thus, by placing a dish of water under the receiver of an air-pump, together with some sulphuric acid to absorb the vapour, the water may be frozen by rapidly exhausting the receiver. Again, by directing a spray of ether upon animal or vegetable tissue, the latter is soon frozen by the cold produced by the rapid E. of the former, use being made of this for producing local anaesthesia in the case of small operations.

Evaporation in nature.—E. is constantly taking place all over the surface of the globe, but is most rapid in tropical regions, where the hot air is able to take up a large amount of moisture from the sea, lakes, and rivers. This water-laden atmosphere, when it condenses with a cooler climate, is chilled and gives up some of its moisture in the form of rain, snow, or hail, according to the surrounding temp. Thus the water on the earth is undergoing a constant cycle of E. and condensation which may be represented as follows:—



Taking the West of Europe, E. is rapid in spring and still more so in summer, and on the other hand, from Nov. to Feb. it is almost at a standstill, due to the falling temp. and consequent moisture-laden state of the atmosphere. Measurements of the annual E. have been made at various places, the following being a selection. Interior basin of the United States in lat. 36° N., 150 in.; Cumana, S. America, 136 in.; Madras, 91 in.; Co. Cavan, Ireland, 13 in.; and over a very large area in Europe less than 20 in. It has been found that in general the ann. E. and rainfall are approximately proportional.

Commercial applications of evaporation.—E. plays an important part in most

manufacturing processes, and various means have been devised to facilitate the removal of moisture from solutions and substances. Thus brine is concentrated by being made to trickle down piles of brushwood, placed in a current of air, a large surface being thereby exposed for E. The same principle is applied to the coolers used in breweries and elsewhere, a stream of water being made to trickle over the pipes containing the warm liquid. Liquids like sugar, syrups, and various extracts are evaporated in vacuum pans, in which the external pressure is reduced as far as possible by suction pumps, so that E. will proceed fairly rapidly, even at a low temp. The same principle is made use of in the multiple effect evaporator, which consists of a series of vacuum pans in which the vapour produced by the E. of the liquid in the first pan is used to heat the liquid in the second pan, and so on. In freezing machines of the liquid ammonia type, the low temp. is produced by the rapid E. of the liquefied ammonia under reduced pressure. See E. RAUSBRAND, *Evaporating, Condensing, and Cooling Apparatus*, 1933.

Eve, see ADAM.

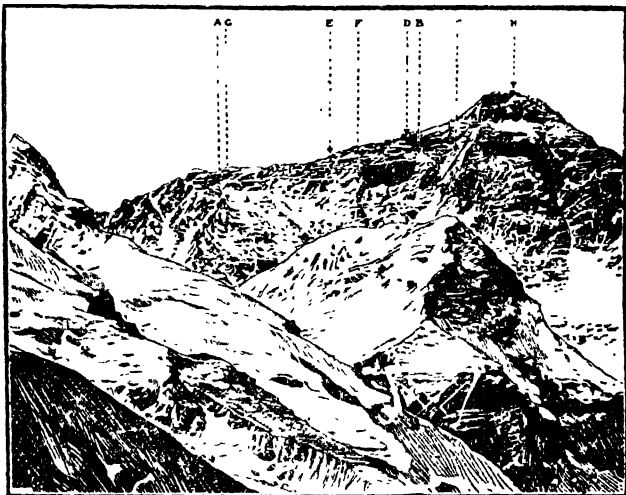
Evection (Lat. *evectio*, carrying upward, forth), in astronomy, a lunar perturbation or inequality, first discovered by Ptolemy. This inequality or eccentricity of the moon's orbit (alternately increasing and decreasing) is produced by the sun's action. E. may alter the moon's place by a maximum amount of 1° 15' in either direction, and the time of occurrence of an eclipse by six hours. These variations take place almost semi-annually, and depend partly on the position of the perigee. See LUNAR THEORY; MOON.

Eveleth, city of St. Louis co., Minnesota, U.S.A., lying in the midst of the great red and brown hematite iron ore deposits of the Mesabi Range. Mining and shipping are the prin. industries. Pop. 6800.

Evelyn, John (1620–1706), Eng. diarist, b. at Wotton House, near Dorking, Surrey, was educated at Southover free school, and went, in 1637, to Balliol, but came down in two years without a degree. He had some time before been admitted as a law student, and in 1640 he took up his residence in the Temple, though he never, apparently, thought of practising as a barrister. He was interested in horticulture, and improved the grounds of his father's estate of Wotton. From 1641 he travelled much on the Continent, but settled in England in 1652 at Sayes Court, Deptford, where he devoted much of his time to the gardens, which he brought to a state of high perfection. He was author of a celebrated work on arboriculture, entitled *Sylva*, or *A Discourse of Forest-Trees* (1664), etc. He did, indeed, do much to improve horticulture and introduce exotics into this country. He also wrote on a wide variety of subjects, including hist., religion, architecture, law, sculpture, navigation and commerce, medals, and sallets and pub. sov. tracts, of GK., Lat., and Fr. authors. The *Diary* was edited in later eds. by J. Forster (1850–52); H. B. Wheatley (1879 and 1906); C. Newnes

(1906); A. Dobson (1906); also in Everyman's Library (1907). See Helen Evelyn, *The History of the Evelyn Family*, 1915; Lord Ponsonby, *John Evelyn*, 1933; and the bibliography by G. Keynes, 1937. After the Restoration he held many minor offices and sat on various commissions. For a while he was secretary of the Royal Society, but twice declined the presidency. A friend of many notable people, including Pepys, he was *au courant* with most of the events of the day, which were duly recorded in his famous *Diary* which was

founded in 1880. The *St. James's Gazette* was from the first distinguished for its strongly literary character, and belonged rather to the category of reviews, like the *Spectator*. There were three other penny Conservative evening papers in the field against it, with the result that the 'news' element was increased, and it fell into line with particular movements by becoming an ardent supporter of Imperialism (q.v.). In 1903 it became the property of C. Arthur Pearson, who, in 1905, amalgamated it with the *Evening Standard*,



The Alpine Journal

MOUNT EVEREST

A, Camp. VI.: 26,700 ft. B, Point reached by Somervell in 1924. C, Point reached by Norton in 1924. D, 'The Second Step,' where Mallory and Irvine were last seen alive. E, 'The First Step.' F, Point reached by Finch and Bruce in 1922. G, Point reached by Mallory, Norton, and Somervell in 1922. H, The Summit.

discovered in 1817 in an old clothes basket and first pub. in 1818 ed. by Wm. Brac. It is a mine of information about England and the Continent in his day.

Evelyn, John, the Younger (c. 1655-98), Eng. translator and scholar, son of the diarist (d. 1706). E. trans. Plutarch's *Life of Alexander the Great* (1683-86), Rapin's poem, *Of Gardens* (1673), and Chassagnol's *History of the Grand Visiers* (1677). He contributed some Gl. hexameters to his father's *Sylva* (3rd ed.), 1678. Examples of his verse are in Dryden's *Miscellanies*, and Nicols' *Collection of Poems*.

Evening Primrose, see ORNOTHERA.

Evening Standard, a penny London evening paper formed, by an amalgamation in 1905, of two evening papers, the *Evening Standard*, founded in 1827 as the *Standard*, and the *St. James's Gazette*,

which had also become his property. It is now controlled by Lord Beaverbrook (q.v.) and makes a prominent feature of politics. With much the smallest circulation of the Beaverbrook trio of newspapers (the others being the *Daily Express* and the *Sunday Express*), the E. S. has always exercised in the past the most political influence. Among its editors in recent years were Frank Owen, Michael Foot, and Sydney Elliot, all independent minded. The paper is notable for its political and social cartoons by David Low, who came to the paper from the *London Star*.

Everdingen, Aldert (Allart) van (1621-1675), Dutch landscape painter and engraver; studied under R. Savery and P. Molyn, surpassing both. He excelled in sketches of rugged scenery, marine views, and storms. Among his best pictures are:

'Landscape with River,' c. 1648 (Louvre); 'Landscape with Waterfall,' 1650 (Munich); 'Wooded Slope,' 'Castle by River,' and 'Norwegian Waterfall' (Berlin Museum); 'Norwegian Landscapes' (National Museum, Amsterdam); 'Storm at Sea' (Munich). His most famous etchings are the series illustrating 'Reineke Fuchs.' Some of his original drawings are in the Brit. Museum.

Everest, Mount, or Chomolungma, summit of the Himalayas. It is situated on the frontier between Nepal and Tibet. The height has been ascertained as over 29,000 ft., and it is the highest mt. in the world. Its name is derived from Sir George Everest, a surveyor-general of India. Recent attempts to reach the highest peak have formed an epic story of Brit. pluck and endurance. In 1921 a reconnaissance party was sent out by the joint enterprise of the Royal Geographical Society and the Alpine Club, and this made an important survey of the mt. In the following year a climbing party approached the mt. by the Rongbuk Glacier on the Tibetan side, and in this attempt Norton, Somervell, and Mallory reached the height of 26,800 ft. without making use of oxygen; while Bruce and Finch, with a Gurkha who accompanied them, reached 27,200 ft. with oxygen. In 1924 a carefully organised expedition under Gen. Bruce set out from Darjeeling in the last week of March, forming themselves into two parties as they crossed Tibet in order not to overcrowd the rest-houses. In April the command was taken over by Col. Norton, owing to the ill-health of Gen. Bruce. Camps were estab. at different heights on the mt.; terrible snowstorms and blizzards were encountered, and at one time the temperature recorded 56° of frost. On May 15 a visit was paid to the Holy Lama in the Rongbuk Monastery, and his blessing was bestowed upon the native carriers. Early in June came the final stages. From a high camp Norton and Somervell climbed to 28,000 ft. without oxygen and Somervell alone to 28,130 ft. Later, with five porters to carry provisions and reserve oxygen cylinders, Mallory and Irvine estab. a still higher camp. It is unknown whether they actually reached the summit, for when last seen they had achieved the height of 28,230 ft., but the attempt cost them their lives, and their bodies have not been recovered. An illustrated account of this expedition, with a contribution by each of the survivors, is in the *Geographical Journal* for Dec. 1924. Aircraft flights were made over the summit by the Marquess of Clydesdale and Fl. Lt. McIntyre, members of the Houston expedition, in 1933. There were further climbing expeditions in 1933, when Wyn Harris and Wager found Mallory's ice-axe at about 28,000 ft., 1936, and 1938, but none has yet succeeded in reaching the summit, though some lives have been lost and a point within a thousand feet of the top has been reached. See C. K. H. Bury, *Mount Everest, the Reconnaissance*, 1921; C. G. Bruce, *The Assault on Mount Everest*, 1922; E. F. Norton, *The Fight for Everest*, 1924; Sir F. Younghusband,

The Epic of Mount Everest, 1928; H. Rutledge, *Everest* 1933, 1934, and *Everest—the Unfinished Adventure*, 1937; F. S. Smythe, *Camp Sir*, 1937; Douglas and Clydesdale (Marquess of) and D. F. McIntyre, *The Pilot's Book of Everest* 1936; H. W. Tilman, *Mount Everest* 1938-1948.

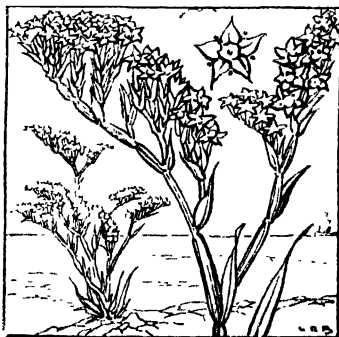
Everett, (1) until 1870 part of Malden, 3 m. N. of Boston, U.S.A., now a city with a pop. of 46,700 with important manufs., including coke, chemicals, leather goods, tools, trunks, etc. (2) A city of Washington, U.S.A., 28 m. N. of Seattle on Puget Sound, with a fine harbour and beautiful mountain scenery, many lumber mills, iron works, and factories and salmon canneries. Pop. 30,200.

Evergem, small tn. of E. Flanders, Belgium, situated 4 m. N. of Ghent. Makes lace, linen and cotton goods, starch and soap. Pop. 8700.

Everglades, lake in S. Florida, U.S.A. It is large but shallow, and contains a great number of small is. which are covered with dense overgrowth and are frequented by numerous alligators. Florida is sometimes called 'Everglade State,' after this swampy dist.

'**Evergreen State**,' see WASHINGTON.

Evergreens, are those plants, shrubs and trees which keep their leaves and do not shed them annually. The leaves sometimes live as long as four or five years on E. trees, but they are constantly shedding and making new ones, so that the trees are never left bare. In tropical climates certain trees that are deciduous when grown in temperate regions are E.; as an example of this the *Robinia pseud-acacia*, popularly known as acacia, may be quoted. All conifers except the larch are E., and many shrubs and creepers, e.g. box, laurel, ivy, are cultivated because they do not shed their leaves in autumn.



EVERLASTING FLOWERS: STATICE

Everlasting Flowers or Immortelles, are flowers which retain their form and colour for a long time after they have been picked and dried. A few genera of the order Compositae are among the best known, and sev. are cultivated in gardens for

decorative purposes; they are often dyed bright colours, and some are bleached white. *Antennaria dioica*, mountain everlasting, or cat's foot, is the only Brit. species growing wild, but *Anaphalis margaritacea* is naturalised in S. Wales, Scotland, and the Channel Is. Species of *Helichrysum* are the ones best suited for cultivation in gardens. They should be gathered on a dry day before the flowers are fully opened. Statice, or sea lavender, is a graceful species used both for greenhouse and for garden cultivation. (The genus is sometimes referred to as *Lunonium* by botanists.) It has purplish flowers in summer, and is about 18 ins. in height.

Eversley, vil. of N.E. Hampsh-ire, England. There is in the neighbourhood a fine old Jacobean residence, Braunschill House, which was built for the son of James I. Pop. 900.

Evertsen, Dutch naval family which produced sev. distinguished officers, of whom five were brothers. Two of them were killed in action, viz. Vice-Adm. Cornelius in 1666 in the second battle off the N. Foreland; and Adm. Jan. in the same year in 'St. James's Fight.' Cornelius, the son of Jan., attained the rank of vice-admiral and died in 1679. No fewer than nine members of the E. family fell in action at sea.

Everyman, title of a morality play of the fifteenth century. The characters are Everyman, God, Death, Good Deeds, Knowledge, Beauty, Strength, etc. Everyman is summoned by Death, and all his friends forsake him, except Good Deeds. See E. Rhys (ed.) *Everyman and other Interludes* (Everyman's Library).

Everyman's Library. The title of a comprehensive library of the representative works of all time, initiated in 1906 and pub. at a popular price by Joseph Malaby Dent (q.v.) of the firm of J. M. Dent & Sons, Ltd., London, and imported into the U.S.A. and pub. there by E. P. Dutton & Co., Inc., New York. The name was suggested by Ernest Rhys, the general editor (q.v.), whose cue was the line in the old morality play of *Everyman*, 'I will go with thee, and be thy guide.' It now comprises (1919) 987 vols., and new vols. are issued every year. There existed in Eng. previously to its inauguration a number of inexpensive series of classics, but nothing on a large enough scale to ensure the universality essential to complete success. Among its fore-runners were Henry Morley's *Universal Library*; the *Camelot Series*; Grant Richards's *The World's Classics*, now continued by the Oxford Univ. Press; and J. M. Dent's own ed. of the *Temple Classics*. There were also two very notable continental exemplars, the *Reclame* library of Germany and the *Bibliothèque Nationale* of France. The democratisation of knowledge was the fundamental purpose of E. L., and this was in no small measure a spur to the enthusiastic co-operation of editors, printers, paper-makers, binders and other collaborators of the publisher. The essentials of inexpensive production, coupled with good

quality of materials and workmanship and an attractive format, having been settled, some 10,000 copies of nearly every book in the first one hundred and fifty of the series were printed and issued in three batches within a couple of years; and the price of each vol. was fixed at one shilling (unavoidably increased after the 1914-18 war and still further during and after the Second World War, the price in 1919 being four shillings and six pence).

The success of E. L. necessitated the estab. of Dent's factory, The Temple Press, Letchworth, Hertfordshire, the firm's City binding works not being large enough to cope with the immense binding requirements of E. L. vols. Binding at Letchworth commenced at the end of 1906, and two years later the factory was enlarged by the installation of a printing plant. To-day almost all the vols. are bound at Letchworth; most of them are also printed there, but some are still printed by the outside firms who played a generous part in the inauguration of the library, among whom H. Clay & Sons, Ltd., of Bungay, Suffolk, are outstanding. The size of the vols. is 64 by 4½ in., pocketable but large enough for the bookshelf; the number of pages in the vols. ranges from 250 to 1000. In 1931 the typographical lay-out and binding style were brought into line with modern practice. E. L. consists of thirteen sections: Biography; Classics (Gk. and Rom.); Essays and Belles Lettres; Fiction (which with over 250 vols., is naturally the largest section, including often the complete range of novels by renowned authors, e.g. Dickens, Scott, Jane Austen); History; Oratory; Poetry and Drama; Reference (in which section *Everyman's Encyclopedia* was originally issued); Romance; Science; Theology and Philosophy; Travel and Topography; and books for Young People. There are in fact very few works of out-standing importance in Eng. literature which are not to be found in E. L.; and included in every section is a good number of trans. from famous foreign works. Although most of the vols. have a wide appeal, the publishers have included many less-known works of great importance to students, and such classics as Grote's *History of Greece*, in 12 vols.; Gibbon's *Decline and Fall of the Roman Empire*, in 6 vols.; Mommsen's *History of Rome*, in 4 vols.; and Hakluyt's *Voyages*, in 8 vols., besides many others which, in the ordinary way, are not accessible to the general public.

It is estimated that there are nearly 200 vols. in E. L. containing works not available in any other ed. and about another 50 vols. of works only available in eds. at a considerably higher price. A consistent feature of the library is the use of unabridged texts; only with a relatively few works is an abridged text used, this fact being then plainly stated. Critical and biographical introductions are included wherever desirable, and many of the older works have been specially edited for the series; bibliographies are always given. To keep the library abreast of current scholarship works issued in the

series from twenty to forty years ago are, where necessary, re-edited and completely re-set, recent examples being Plato's *Republic*, in the trans. of Lord Lindsay, the poems of Keats, Matthew Arnold, Byron and Tennyson, the four vols. of *The Spectator* essays, *Lamb's Letters*, in the E. V. Lucas edition, Thucydides' *Peloponnesian War* with a new index, the trans. of Balzac's novels, Boswell's *Johnson*, newly introduced and indexed, and White's *Selborne*, newly annotated. Since 1934 the editors have aimed at including more works in all classifications by modern writers, among such being Samuel Butler, G. K. Chesterton, Joseph Conrad, Havelock Ellis, E. M. Forster, Dr. Charles Gore, W. H. Hudson, Aldous Huxley, Henry James, D. H. Lawrence, Walter de la Mare, Somerset Maugham, H. G. Wells, Virginia Woolf. The Second World War interfered with the production of the Library owing to the shortage of materials and labour, which coincided with an increased demand for the classics of literature, and even four years after the war a considerable number of the 987 vols. were still out of stock, but it is the publishers' intention to restore all the vols., with very few exceptions, to circulation within the shortest possible time. The total sales of the Library during its forty-two years of existence are over 37,000,000. The Library has from its earliest days circulated throughout the world, not only in the Brit. Commonwealth, the U.S.A., and all Eng. speaking countries, but on the continent of Europe, in S. America, Japan, and China, and indeed in the most remote places.

Eves, Reginald (1876-1941), Eng. painter, b. in London: From Univ. College he passed with the Trevelyan Goodall scholarship to the Slade School, where he studied under Legros, Frederick Brown, and Henry Tonks and won the Slade Scholarship. In 1899 his picture 'Waiting' was accepted for the Royal Academy: E. became a regular exhibitor at the Royal Academy, Royal School of Portrait Painters, the Salon and elsewhere, specialising in portraiture. His first portrait to be acquired by the National Portrait Gallery was that of Thomas Hardy, bought in 1931. Other portraits in the same gallery are those of Shackleton and Jelliffe and, in the Tate Gallery, are portraits of Sir Frank Benson and Sir Max Beerbohm. Among his portraits of women are those of the Queen of Spain and Miss Julia Neilson. If he lacked charm of colour, he had a fine feeling for character. Future generations will rely for their knowledge of what the men of his age were like very largely on E.'s portraits. He also excelled in water-colour landscapes.

Evesham, municipal bor. and markt. tn. of Worcestershire, England. It is situated on the r. b. of the Avon, 15 m. S.E. of Worcester. The extreme fertility of the soil renders the neighbourhood most suitable for mrkt. gardening, which is the chief industry. There is a fine bridge over the riv., here navigable, also a library, technical college, hospital, etc. By a

battle fought here in 1265, by which Henry III. regained the throne and the barons were crushed for a time: the Prince of Wales defeated Simon de Montfort, Earl of Leicester. E. is noted for its abbey founded in 701, a magnificent detached tower, rebuilt in the fifteenth century, 110 ft. high, and containing a clock with chimes and ten bells, which still remain, also a mutilated gateway of the twelfth century, a fine arch and the abbot's stables. Pop. 8800.

Eviction, in law, means the ejection of a person from possession of lands or tenements. E. may be total or partial, an instance of the latter being where some other person sets up a claim to a right of way or other easement over the land. Entry by a landlord to view the state of repair, or to effect alterations, is not E. or trespass if the tenant agreed to allow the landlord to enter for such purposes. To maintain an action for damages for E. physical expulsion need not be proved, any act tending to prejudice the quiet enjoyment or comfort of the tenant being an E. or *constructive E.* The remedy for E. is generally by an action of damages for breach of a covenant (*q.v.*), for quiet enjoyment, and an action of ejectment to recover the land (*see ENTRY*); but, when there is no contractual relationship between the tenant and the person evicting him, an action of damages for trespass would be the appropriate remedy, and if the evictor acted without colour of right, the tenant would recover heavy damages. In the case of a house protected under the Rent Restriction Acts, the Courts require satisfaction on sev. essential points before they will grant an E. order. *See also RECOVERY OF LAND.*

Evidence. Legal E. denotes the means by which facts are ascertained for judicial purposes. It is a branch of the law of procedure, but there exists no general or codifying Act, and indeed it is probably undesirable that judicial discretion in the matter of reception of E. should be so fettered. Sir James Fitzjames Stephen was employed in 1872 to draw a code for England, but the code drawn never passed into law, although its model, drafted by the same judge, subsequently became the Indian Evidence Act of 1872. The whole of our law of E. as it exists now, is a system of restriction upon the admission of testimony, and based as it is upon the formal rules of inductive logic, reveals a strong tendency to narrow the freedom which formerly characterised, especially in state trials, the conduct of judicial proceedings. The bulk of the rules of E. is negative in character. That part of the law of E. which relates to *relevancy of facts* as distinct from *mode of proof of a fact* deemed to be relevant is dominated by four primary rules of exclusion or rules which, (subject to certain important exceptions), exclude the admission as E. of facts which outside legal circles might well be regarded as affording excellent testimony. These rules include the following four classes of facts: (1) Facts similar to, but not specially connected with, each other, *e.g.* if the issue is whether A forged B's signature

to a cheque, the fact that he forged C's signature on some former occasion is irrelevant. But if there is a question whether an act was done intentionally or accidentally by A, the fact, if so, that such act formed part of a systematic course of conduct would be relevant, e.g. if A is suing on a policy of fire insurance, the fact that he had sustained fires in other houses insured by him would be relevant to the issue whether the fire was accidental or not. (2) The fact that a person not called as a witness has asserted the existence of any fact. This is the fundamental principle which is more popularly expressed in the maxim that hearsay is no E. The most striking exceptions to this rule are afforded by the various rules of convenience which allow of the admission of statements by deceased persons (as to which see DECLARATIONS OF DECEASED PERSONS), and statements which amount to admissions. Admissions may be E. against a party to an action when made in his behalf by any person who has a substantial interest in the event of the proceedings, or who is an agent expressly or impliedly authorised by that party to make such admissions. But admissions made 'without prejudice' can under no circumstances be adduced in E. The rule against hearsay renders irrelevant statements in books or documents not made by parties to the proceedings or their authorised agents. Exceptions to this rule, excluding documentary E., include, *inter alia*, entries in public records, official books, or registers; recitals of public facts in statutes and proclamations, and statements in works of hist. Final judgments, orders or decrees of any court are always E. as against all persons of all facts stated or decided by such judgments, etc., or upon which they are based, but not of facts which may only be inferred as probable from their existence. (3) The fact that any person is of opinion that a fact exists. Fact not opinion is what a witness is in general required to state. But the opinions of experts on points of science or art are admissible in E., subject to the judge's decision on their competence as experts. As a matter of law judges have full power on all technical matters to call in the aid of judicial assessors, but except in Admiralty cases they seldom avail themselves of their statutory powers. (4) The fact that any person's character is such as to render conduct imputed to him probable or improbable. E. of character, may, however, be given in criminal trials in certain circumstances stated in the Criminal Evidence Act, 1898. That Act allows the prosecution to give E. of a prisoner's bad character if the prisoner has himself or by his counsel given E. to establish his own good character, or has at the trial cast imputation on that of the prosecutor or the witnesses for the prosecutor or the witnesses for the prosecution. E. of previous convictions may be given before the verdict (a) if proof of such former offences is admissible on other grounds, e.g. as showing a systematic course of conduct (see above); (b) to rebut E. of good character.

E. is said to be either oral or documentary. Documentary or written E. consists of records, documents under seal, such as charters and deeds, and writings not under seal. Bentham used the term real E. to denote such E. as was neither oral nor documentary in the above special sense; but E. which is not oral is generally classified, even if unscientifically, as documentary. Acts of Parliament are records of the highest nature, from their quality as the memorials of the legislation; but a distinction is made with respect to E. between public and private statutes. A public statute requires no proof in courts of justice; but private Acts must be proved by copies compared with the original roll of Parliament. Records of the proceedings of courts of justice are proved by exemplifications, sworn copies and office copies. Exemplifications are transcripts of the records of different courts, accredited by having the seals of such courts attached to them. Sworn copies are transcripts made by individuals who authenticate them upon oath when they are produced in E. Office copies are copies certified to be true and accurate by an officer expressly entrusted with that business. The reception of various certificates, official and public documents, is regulated by various statutes, especially the 8 and 9 Vict. c. 113. Charters and deeds are proved by the production of the instrument and proof of the execution by the party to be charged with it; but where the document is more than thirty years old the execution need not be proved. The general rule is that the original deed must be produced. Deeds attested must, in general, be proved by one at least of the attesting witnesses; but if the witnesses be dead, or cannot be found, the execution may be proved by proof of the handwriting of the party. The method adopted to prove handwriting in general is to secure the testimony of some person acquainted with the handwriting of the individual in question, or who has seen him write, or who has had written correspondence with him; but otherwise the testimony of persons skilled in calligraphy as 'experts' is wholly excluded.

Practically all persons are competent to give E. at the present day. Formerly plaintiffs and defendants were not allowed to give E. on the ground that they were interested parties, the result being that probably the best possible E. was excluded. Where the judge decides that any witness is too young or mentally infirm to testify, the witness is incompetent to give E. In certain cases witnesses may claim a privilege (see CONFIDENTIALITY IN LAW). Since the passing of the Criminal Evidence Act, 1898, both the accused and the husband or the wife of the accused are competent witnesses; but the principle that the accused is not compelled to incriminate himself is preserved by the provision that such witnesses are not compelled to give E. except that the wife or husband of accused may be called either for the prosecution or the defence, and without the consent of the accused, if he

(or she) is charged with any offence under the Vagrancy Act, 1824 (neglect to maintain wife and family), offences against the Person Act, 1861 (relating to rape, indecent assault, and the like offences), the Married Women's Property Act, 1882 (offences by a married man or woman against the other spouse's property), and the Criminal Law Amendment Act, 1885 (sexual offences). E. must be given on oath unless the witness objects to being sworn, upon the ground that he has no religious beliefs, when he may instead solemnly affirm in the Scottish fashion. Children of tender years who do not understand the nature of an oath may give E. without being sworn if the judge thinks the child sufficiently intelligent to give E. and to understand the moral obligation of speaking the truth.

The only change for many years in the principles of the law of E. is that introduced by the Evidence Act, 1938, which admits documentary E. in civil proceedings in order to establish facts on which direct oral E. would be admissible. But such E. is only admitted where the maker of the documentary statement *either* had personal knowledge of the matters therein dealt with, *or*, if he had not, the document is part of a continuous record and he made the statement in the performance of a duty to record information supplied to him by a person who might reasonably be supposed to have personal knowledge of the matters recorded. But in either case the maker of the statement must be called as a witness. The court may, in order to avoid undue expense or delay, admit such a statement in E. notwithstanding that the maker of it is available but is not called, and in these circumstances the court may accept a certified copy of the original document. But nothing in the Act will render admissible as E. any statement made by a person interested at a time when the proceedings were pending or anticipated. It is for the court to decide what weight is to be attached to such statement, regard being had to the question whether the statement was or was not made contemporaneously with the occurrence or existence of the facts stated, and to the question whether or not the maker had any incentive to conceal or misrepresent the facts. See Stephen, *Digest of the Law of Evidence*, 1876; Taylor, *The Law of Evidence*, 1920; Roscoe, *Digest of the Law of Evidence*, 1928; Phipson, *Law of Evidence*, 1942.

Evil has no positive existence. It is the privation of good, rather than the mere absence of it, *e.g.*, it is a physical evil for a man to be blind, since it is natural for him to see, and it is a spiritual evil for a man to refuse to do what he knows to be good. The existence of E. is one of the everlasting problems both of theology and philosophy—how to account for it, and what to infer from it; and in accordance with the significance attached to it, philosophy inclines to an optimistic or pessimistic view of the world, or, further, an attempt to compromise between the two. The last theory would explain E. as warring against the triumph of good,

and is thus of a dualistic character. J. S. Mill, in his *Essays on Religion*, regards this as a plausible explanation of the mixture of good and E. in the world. The difficulty of explaining E. is theological rather than scientific, it being often stated that for science there is no E. in the universe. The teachings of Freud and the psychoanalysts on the origin of the 'sense of guilt' are of interest in this connection, but the recent tendency of scientific thought is to recognise its limitations, and to leave moral questions to the theologians.

Evil Eye. From the earliest times there has existed the superstition that certain people possess the power of injuring, bewitching, and even killing by a glance from the eye; hence the expression Evil Eye. Children and young people were supposed to be particularly susceptible, and in the East any unexpected calamity befalling a child was accounted for by its having been 'overlooked.' The glance of a person suffering from any physical calamity, such as a cast in the eye or a squint, is regarded as particularly dangerous. The power was supposed to be involuntary in many cases and not cultivated with evil intent. Few of the old classic writers fail to refer to it, and the wearing of amulets or charms against it was universal. Envy was supposed by many to be the impulse of the E. E., and it was therefore looked upon as unfortunate to have one's possessions praised unduly, the prosperous in particular having reason to fear it. The power of the E. E. over animals as well as children was dreaded, and in the Scottish Highlands as late as the eighteenth century the belief as affecting cattle was universal. It is still feared for horses in India and China.

Evil-Merodach, Avel, or Amel-Marduk ('man of Marduk'), king of Babylon (c. 561-559 B.C.), son and successor of Nebuchadnezzar. He released Jehoiachin, King of Judah, from prison in the thirty-seventh year of his captivity (see 2 Kings xxv, 27). He was killed in a rebellion led by his brother-in-law, Neriglissar (Nergalsharezer), who seized the crown in his stead. Berosus (third century B.C.) speaks of him as an arbitrary and unwise ruler.

Evoli, see ENOLI.

Evolute, see CURVE.

Evolution (Lat. *evolutio*, an unrolling), literally, the process of opening out or unfolding what is wrapped up. In biology it is applied to the unfolding of successive phases of development in the growth of animal and vegetable organisms. Herbert Spencer's definition is as follows: 'E. is an integration of matter and concomitant dissipation of motion; during which the matter passes from an indefinite, incoherent homogeneity to a definite, coherent heterogeneity, and during which the retained motion undergoes a parallel transformation.' (*First Principles*, pt. II, chap. xvii.). The theory of E., first started by C. Bonnet in 1762, is the hypothesis that the germ (instead of being brought into existence by the process of fecundation) is developed from a

pre-existing form which contains the rudiments of all parts of the future organism. This theory (also called the theory of Proliferation) is directly opposed to that of 'epigenesis.' This latter view, which originated with Aristotle, was supported in the eighteenth century by C. F. Wolff, who believed that development came about through a series of new formations and transformations, and 'epigenesis' entirely superseded the old evolutionist theories of Bonnet, until they were revived in a more refined form in the 'germ-plasm' theory of Weismann. It is shown that the ovum cannot be entirely undifferentiated, as parts of the adult organism may be traced back to corresponding parts in the embryo. E., however, in this sense is only a branch of embryology (*q.v.*). The word is more generally applied to the development of matter from its simple unorganised condition—or even from the electron-systems called atoms from which matter itself evolved—to the present structure of the physical universe. This is called Inorganic E. and its main direction is towards the 'degradation' of energy, for in every transformation of inorganic matter some energy is wasted. Living matter is a more complex form of inorganic matter and the living may be said to have originated from the non-living. Setting aside the possibility of spontaneous generation, matter gradually assumed the properties of living matter through the medium of colloidal compounds of carbon which form the proteid, common only to plant and animal life. Organic E. traces the development of simple unicellular forms of protoplasm, called protista by Haeckel (*q.v.*), to more complex multicellular forms, from aquatic forms to terrestrial, from invertebrates to vertebrates, and from mammals to man (*see BIOLOGY*).

The theory of E. is especially associated with the name of Charles Darwin (*see DARWINISM*), but it had been foreshadowed by Aristotle among the Gks., and by Linnaeus and Buffon, Erasmus Darwin and Lamarck in the eighteenth and nineteenth centuries. A group of Catholic Darwinists also appeal to St. Augustine's teaching of 'rationes seminales.' The evidence for organic E. lies in the study of fossils (paleontology), the similarities in development and in structure of certain animals (and plants), and in the facts of their geographical distribution; there is also direct evidence of blood relationships in higher animals.

In the sphere of idealist-philosophy Hegel developed the moral and abstract element of his philosophy of spirit in correlation with the idea of E. Apart from the fact of E., various theories as to its method have been propounded—the theory of inheritance of acquired characters by Lamarck and that of natural selection by Darwin and Russel Wallace. In addition, there is the theory of orthogenesis that evolutionary change follows definite and predetermined directions, and also Cope's theory of kinetogenesis or 'mechanical genesis.' In so far as orthogenetic E. tends towards the development

of the 'highest' type, it has not been a straight ladderlike process, but one of slow experiment and frustration, as is shown by the study of paleontology. In fact, E. does not show any tendency to produce a high type, only a number of types, and it is only to the E. of Mind that orthogenesis in the sense of evolving 'upwards' can be applied strictly. We must assume, however, that something of the same nature as Mind is inherent in all living organisms, but in the course of E. new properties arise. Such E. Bergson calls 'creative' and Lloyd-Morgan 'emergent.' It must be borne in mind that E. as a theory cannot adequately explain the cause of such emergencies; it only professes to show their relation to preceding and succeeding emergencies. Before the emergence of Mind in man E. was operated by the blind purpose of adapting types to their environment and of insuring the survival of those best adapted, but with the beginning of what is called the 'psychozoic period' Mind became dominant, and, with Mind, values, and subsequently ethical values, came into being. Man is the agent of a self-conscious E., which, as Thomas Huxley points out in *Evolution and Ethics*, is at variance with the non-moral cosmic process from which he himself has evolved. We may hold, however, that a self-conscious ethical E. will be the central fact of future development. Whereas before Mind the direction of E. was decided by environment, Mind enables man to control this and, in the words of L. T. Hobhouse, 'to grasp the conditions of its development that it may master and make use of them in its further growth.' In connection with purpose in E. we may recall Huxley's definition of a species: 'In most cases a species can be regarded as a geographically definable group, whose members actually interbreed or are potentially capable of interbreeding in nature, which in nature does not interbreed freely or with full fertility with related groups, and is distinguished from them by constant morphological differences.' Huxley, therefore, gets rid of the idea of purpose from the universe but believes in 'biological progress.' He detects no purpose in past E.: 'The purpose manifested in evolution, whether in adaptation, specialisation, or biological progress, is only an apparent purpose. It is just as much a product of blind forces as is the falling of a stone to earth or the ebb and flow of tides. It is we who have read purpose into evolution, as earlier men projected will and emotion into inorganic phenomena like a storm or earthquake. If we wish to work towards a purpose for the future of man, we must formulate that purpose ourselves. Purposes in life are made, not found.' Commenting on these statements, Julian Huxley says: 'But then if it be admitted that, through the mechanism of natural selection, there is purpose in the universe, can we resolve the difficulty offered by apparent examples of fiendish purpose, by the thought that we, with our high level of consciousness, may be reading into the lower levels feelings which do not there exist? Or

must we appeal, with the theologians, to a fundamental falling-away of the universe from its destined purpose—in short, to Original Sin? (See Julian Huxley, *The Modern Synthesis*. See also ANTHROPOLOGY; BIOLOGY; DARWINISM; MAN. The method of E. has long ago superseded the *a priori* in the writing of hist.; one of the most brilliant expositions of the method in this sphere was the work *Ancient Law* by H. S. Maine (1861).

Bibliography.—C. Darwin, *On the Origin of Species*, 1859; *The Descent of Man*, 1871; E. Haeckel, *The History of Creation*, 1876, also *The Evolution of Man*, 1905; H. Spencer, *Factors of Organic Evolution*, 1887, also *First Principles*, 1900; G. J. Romanes, *Mental Evolution in Man*, 1888, also *Darwin and after Darwin*, 1892; A. R. Wallace, *Darwinism*, 1889; A. Weismann, *The Germ-Plasm*, 1889, also *The Evolution Theory*, 1904; P. Geddes and J. P. Thompson, *The Evolution of Sex*, 1889; T. H. Huxley, *Evolution and Ethics*, 1893, also *Collected Essays*, 1894; W. Bateson, *Materials for the Study of Variation*, 1894; L. T. Hobhouse, *Mind in Evolution*, 1901, also *Morals in Evolution*, 1906, and *Development and Purpose*, 1913; H. Bergson, *Creative Evolution*, 1911; E. Westermarck, *The Origin and Development of the Moral Ideas*, 1917; R. S. Lull, *Organic Evolution*, 1917, 1929; J. S. Huxley, *Essays of a Biologist*, 1923, and *Evolution: the Modern Synthesis*, 1942; C. Lloyd-Morgan, *Emergent Evolution*, 1923; A. Dendy, *Outlines of Evolutionary Biology*, 1923; E. S. Goodrich, *Living Organisms*, 1924; D. Dewar, *Difficulties of the Evolution Theory*, 1931; Sir A. Keith, *A New Theory of Human Evolution*, 1948.

Evora (Ebora, or Liberalitas Julias): (1) Dist. of Portugal, extending W. from R. Guadiana and the Sp. frontier. Pop. 207,900. (2) Tn. and archiepiscopal see, cap. of above, Alentejo prov., 70 m. from Lisbon. It has ramparts and a citadel, a fine Gothic cathedral (1186), narrow, picturesque streets and places, a theatre, library, and an archaeological museum, in the building of the former Jesuit univ. There are also the lyceum, archiepiscopal seminary, and orphanage. It manufs. textiles and leather and has a trade in wine. The aqueduct and ruined temple of Diana are attributed to Sertorius, who captured E. about 80 B.C. E. is bounded by the Serra d'Ossa on N. and E. Pop. 16,000.

Evremond, Saint-, Charles Marguetel de Saint-Denis (1613-1703), b. at St. Denis in Normandy, and educated at Clermont, Oen, and later at the Collège d'Harcourt in Paris. He afterwards entered the army, and fought with distinction in the Thirty Years' War, seeing much service in the Netherlands. He had to flee, however, in 1661, first to Holland and thence to Eng. where he received a cordial welcome from Charles II. and became the chief figure of the salon of the Duchess of Mazarin in London. His fame as a Fr. writer and wit is notably illustrated in his *Conversation avec le Père Canaye*, and *Lettre sur la Paix des Pyrénées*, and his writings include

various essays and comedies and the charming letters to Ninon de l'Enclos. For good vols. of selections, see C. Giraud (1865) and Lescoure (1881). Although he lived for the best part of forty years in Eng., E. never learned Eng., and was unacquainted with Shakespeare. He was buried in Westminster Abbey. E. figures in Dickens's *Tale of Two Cities* under the assumed name of Charles Darnay.

Evreux, tn. in France, cap. of the dept. of Eure. The cathedral (eleventh century) is its most interesting building. The church of St. Taurin is noted for its belfry, 144 ft. high. It manufs. hosiery and textiles, and has iron and copper works. In the Second World War much damage was done to the tn., including the cathedral. In the advance of the Allies to the Seine E. fell to the British forces on Aug. 23, 1944, soon after the elimination of the Falaise 'pocket.' Pop. tn. 20,400, arron. 136,000.

Evseyevich, Grigory, see ZINOVIEV, GEORGY.

Ewald, Heinrich Georg August (1803-1875), famous Ger. Orientalist and biblical critic b. at Göttingen. He was prof. of philosophy and Oriental languages at Göttingen, 1827-37; prof. of theology at Tübingen, 1838-48; and again at Göttingen, 1848-67. He lost his position for a time for political reasons, both in 1837 and 1867. His first book on *Genesis* appeared in 1823. E.'s greatest work was *Geschichte des Volkes Israel bis Christus*, 1843-59, trans. into Eng., 1867-86. Other works are *Kritische Grammatik der hebräischen Sprache* (1827); *Die Poetischen Bücher des alten Bundes* (1835-39), *Die Propheten des alten Bundes* (1840), *Die Altertümer des Volkes Israel* (1848), *Die Lehre der Bibel von Gott* (1871-76). Many of his works have been trans. into Eng. See T. W. Davies, *Heinrich Ewald*, 1903.

Ewald, Johannes (1743-81), Dan. poet, b. at Copenhagen, son of a pastor. In 1764 he wrote an allegorical poem entitled *Lykkens Tempel*, which was well received, but his lyrical power is best shown in the biblical drama, *Adam og Eva* (1769), and in the lyrics *Til Sjaelen* and *Til min Moltke*. His most beautiful work, the opera *Fiskerne*, was written in 1778, containing a song called 'Kong Christian stod ved højen Mast,' which has become the national song of Denmark.

Ewart, James Cossar (1851-1934), Scottish zoologist, educated at Penicuik and Edinburgh. Became prof. of natural hist. at Aberdeen in 1878, and regius prof. of natural hist. at Edinburgh Univ., 1882. Started the marine biology station near Aberdeen in 1879, and became a member of the Fishery Board for Scotland in 1882. His works include: *The Locomotor System of the Echinoderms* (with Romanes) (1881), *On the Preservation of Fish* (1887), *Guide to Zebras, Hybrids, etc.* (1900), *On a Pre-hyaline Hybrid* (1907), *The Development of the Horse* (1915), *Moulting of the King Penguin* (1917), *The Nesting Feathers of the Mallard* (1921).

Ewe, group of Negro people in W. Africa, living off the Slave Coast, in a country to which they give the name of

'Eweme' (Land of the Ewe). Their family consists of five groups: the Anlo, the Kpeli, the Jeji, the Dahomeyans, and the Mahi, all speaking different dialects of E. E. are a pagan tribe, noted for their human sacrifices in honour of the dead.

Ewell, Richard Stoddert (Stoddard) (1817-72), Amer. soldier on the Confederate side in the Civil war. He graduated at West Point in 1840. In the Mexican war (1847) he was present at Contreras (q.v.) and Churubusco (q.v.). He helped to suppress the outbreak of the Apache Indians in 1857, and resigning his commission on the outbreak of the Civil war, 1861, served under 'Stonewall' Jackson. E. commanded a div. near Richmond (1862) and a corps of Lee's army at Gettysburg (1863). He was badly wounded at the battle of Bull Run (1861), and at Warrenton Turnpike. He was also present at Winchester, the Wilderness, and Spottsylvania Court-house (1864). Captured by Sheridan at Sailor's Creek, near Appomattox R. in 1865, he lived in retirement after the war.

Ewing, Sir James Alfred (1855-1935), Scottish civil engineer, b. at Dundee; in 1881 he pointed out the phenomenon of *hysteresis*, or the lagging of magnetic effects behind their causes. He was prof. of mechanical engineering at the Imperial Univ., Tokyo, Japan, 1878-83; at Univ. College, Dundee, 1883-90; at Cambridge Univ., 1890-1903 (Rede lecturer there, 1904). He was director of naval education, 1903-16; a member of the Ordnance Research Board, 1906-08. During the First World War he was in charge of the cipher department of the Admiralty. He was awarded the Albert medal, 1929. His publs. include: *Treatise on Earthquake Measurement* (1883), *Magnetic Induction in Iron and other Metals* (1891), *The Steam Engine and other Heat Engines* (1894), *The Strength of Materials* (1899), *The Mechanical Production of Cold* (1908), *Thermodynamics for Engineers* (1920), *The Physicist in Engineering Practice* (1923).

Ewing, Juliana Horatia Orr (1841-85), Eng. writer for young people, b. in Yorkshire, daughter of Margaret Gatty, author of *Parables of Nature*, to whose pub., *Aunt Judy's Magazine*, she largely contributed. She married Major E. in 1867, and to this may be attributed her interest in soldiers, as exemplified in many of her tales. Amongst her delightful stories of child-life may be mentioned: *Mrs. Overthway* (1869), *The Brownies and Other Tales* (1870), *Jan of the Windmill* (1876), *Old Fashioned Fairy Tales* (1882), *Jackanapes* (1883), *Snapdragon and Old Father Christmas* (1888), *Purses for Children* (1888). See *Everyman's Library* eds. of *Jackanapes* and *Mrs. Overthway's Remembrances* (1916); life by H. K. F. Eden (her sister) (1885), also Christabel Maxwell, *Mrs. Gatty and Mrs. Ewing* (1949).

Examination, in evidence, denotes the interrogation upon oath of witnesses. E.-in-chief means the interrogation of one's own witnesses; cross-examination, that of the opposing witnesses; and re-examination, that of one's own witnesses after they

have been cross-examined. In E.-in-chief counsel is not entitled to put leading questions, that is to say, questions which suggest the answer expected. In cross-examination there is no such limitation, or, indeed, any other limitation than that imposed by the discretion of counsel himself or the presiding judge. Questions in re-examinations can only be put upon matters arising out of the cross-examination; the object of re-examination is to rehabilitate a witness whose testimony has been shaken in cross-examination, but leading questions may not be put any more than in E.-in-chief. On application to a judge in chambers, leave may be obtained to examine witnesses abroad, by the process called taking evidence on commission. See also EVIDENCE.

Examinations. Educational Es. as now held have evolved from those of the medieval univs. Since the function of the univs. then was only to teach, their tests were directed towards ascertaining fitness to lecture—successful candidates obtaining the Doctor's or Master's degree. Among the earliest univ. tests of which we know details were those held at Bologna in the thirteenth and fourteenth centuries, which consisted of a private *visa voce* examination and a public 'conventus' or delivery of a speech and maintenance of a thesis against opponents. The same principle obtained in the rather more complicated system in vogue at Paris. In both cases the questions included both 'set books' and 'unseens', and heavy fees were required of the candidates, who were placed in order of merit. The Bachelor's degree, which of course preceded the Doctor's, was sometimes awarded without E. on the completion of a course of study, and what test was prescribed in other cases was usually more or less formal. Written answers to set questions, and practical, i.e. other than oral tests, in subjects such as medicine, were later innovations, while the competitive element and the number of subjects required for E. have also largely increased in the course of years. But on the whole the present system of univ. education is a recognisable development of the medieval system, with the difference that the Bachelor's degree has become more important. Thus at Oxford the stages are Responsions or 'Smalls,' Moderations, and Finals (Pass and Honours) for B.A., three years, after which M.A. is awarded on payment of a fee without E. At Cambridge they are the Previous E. of 'Little-Go,' and the Tripos E., in two parts. London has a Matriculation, an Intermediate, and a Final E. for the Bachelor's degree, and it and other modern univs. have largely increased the number of 'faculties' in which degrees are awarded. Numerous other classes of educational E. are now in vogue (for school Es. see under EDUCATION). Open competition is usually adopted for civil service (q.v.) (other than specialist appointments, appointments to the Colonial Service, which are made by nomination after interviewing the applicant, appointments to the diplomatic service and various other appointments), and

other public appointments, while numerous tests are held by various professional and technical bodies in different branches of knowledge. The question of the actual value of E., especially those conducted on a competitive basis, for getting the best man for the position or honour, is a vexed one, involving as it does the fact that the nervous strain of such tests has an adverse influence upon many people. The standard of marking to be adopted is also a point of considerable difficulty, since it is obviously unfair to expect the same percentage on a memory as on a capacity test. See J. Crofts and D. Jones, *Secondary School Examination Statistics*, 1928; C. Valentine, *The Reliability of Examinations*, 1932; P. Hartog and E. Rhodes, *Examination of Exams*, 1935; *The Construction and use of Examinations*, ed. by H. Hawkes, 1936; Ministry of Education Circular 168, April 1948.

Examinations (U.S.A.). Excepting as a means of entry to the higher professions, Es. are regarded rather differently in America from what they are in Great Britain. Entry into most of the univs. has depended more on evidence of reasonably sound preparation in a good grounding school than upon any set tests. But in some cases this method has been modified. The Amer. mind attaches importance to graduation, for which an examination is a usual condition, but in many cases the diploma gained is rather evidence that the student has been an attentive and satisfactory scholar than that a severe test has been passed. In America, Es. of a semi-psychological nature are becoming increasingly popular, especially for entry into business houses and for selecting men and women for promotion. While many of these tests are exceedingly clever and very ably conceived, they often appeal rather to the swift superficial mind than to the slower and more profound. It is probable, however, that for certain commercial purposes such tests may be useful in eliciting information about a candidate that a set examination would miss.

Examiner of Stage Plays, see CENSORSHIP OF THE DRAMA.

Exanthema (a blossoming out), fever accompanied by an eruption. The commonest are Measles, German Measles, Smallpox, Chickenpox, Typhus, Typhoid, Scarletina, and Erysipelas. In most countries these are compulsory notifiable diseases.

Exarch, word of Gk. derivation, signifying chief person, or leader. In the Rom. empire the viceroy of the Byzantine emperor in Italy bore this title, and it has been conferred at different times on governors and chief officers, both in secular and eccles. matters. In the Christian Church E. was originally a title of the bishops, but afterwards came to be applied to a primate only. The spiritual head of the modern Bulgarian church bears the title of E.

Excalibur, the mystic sword of the legendary King Arthur, which, according to the promise of Merlin, he received from the Lady of the Lake. At his death it was hurled into the lake by Sir Bedivere, where

it was received by a hand which rose from the waters.

Excambion, in Scots law, the term applied to the exchange of heritable subjects. Writing is not essential to the legality of an E., word of mouth, supported by subsequent possession, being accepted in a Scots court of law.

Ex cathedra, the pope speaks *ex cathedra* when in virtue of his office he defines a doctrine concerning faith and morals. Hence the phrase has come to be used for any authoritative and official announcement.

Excavation, in an engineering sense, is an open cutting of greater or less dimensions, as opposed to a tunnel, which is roofed in. The various types of machines that have been invented to accelerate and facilitate E. are known as excavators. These machines which are sometimes known as 'steam navvies,' combine the properties of a digger and a crane, and are very useful in dock works and for cutting canals. The kind that generally comes into operation first has the appearance of an ordinary steam crane, save that it is mounted on wheels and rails. It is fitted with an iron bucket or scoop with a heavy handle to which a second chain is fastened. The machine that is used to widen the cutting made by the other class is stationed on a temporary line of rails a few feet from the edge of the cutting. The jib of the machine is lowered until the row of buckets cut into the earth; they then scrape up the side of the bank and passing over the excavator empty themselves into waggon beyond. The machine and the waggons which receive the excavated material are moved along together. Another class of excavator is known as the 'ladder excavator'; this comprises a ladder pivoted at the upper end which can be raised or dropped at the lower end to any required angle. The ladder is constructed of two channel irons braced together, a trolley running in the middle and forming the back of the bucket. The resistance of the excavated material is met directly by a chain which is attached to the bucket. A small independent engine controls the movements of the ladder. The operation of filling, emptying, and lowering a bucket of half a cubic yard capacity takes about forty seconds. Generally speaking, the first type of excavator is capable of more varieties of work, but the second is more powerful. The most economic method of working is for double track roads for waggons to be cut on the flank, a central gullet having first been cut for the machine's own passage. These machines are a modification of the dredgers which are used so extensively for dock works, etc.; in America they are called 'dredgers,' as are the other variety, a practice which is confusing. 'Grabs' are sometimes called 'excavators,' but this use is deceptive as grabs can work in both water and on land, and the term 'excavator' is properly applied only to land machines. See W. Barnes, *Excavating Machinery*, 1928; K. Park, *Principles of Modern Excavation Equipment*, 1942.

Excellency, title of honour, once borne in Great Britain by the viceroy of India and the lord-lieutenant of Ireland and now by the governors of colonies, and ambas.

Excelsior Springs, city of Clay co., Missouri, U.S.A., 939 ft. above sea-level, the most popular spa in the Middle West. Pop. 4600.

Excentric, see **ECCENTRIC**.

Excess Profits Duty or Tax, a tax varying from 40 to 80 per cent imposed in 1915, during the First World War, on profits in excess by £200 or more of those made prior to 1914, the standard by which the excess profits were measured being the average of profits of any two of the three years preceding the war. Exemption was allowed to farmers and to persons engaged in certain specified professions and employments. Though successful in producing revenue, the tax was not economic, as it encouraged wasteful expenditure by the taxpaying firm or company. It was abolished in 1921. In 1937 a new tax, called the National Defence Contribution, was introduced by Mr. Neville Chamberlain to finance rearmament, and bore some resemblance to the old E. P. D. It was levied on the increase of profits in industry over £2000 in any accounting year, and was not applicable to incomes from employment or professions. In the war budget of Oct. 1939, the armaments profits duty was replaced by an E. P. D. 60 per cent. In May 1940, when Mr. Churchill formed a gov. consisting of many labour members, the duty was increased to 100 per cent. The National Defence Contribution was an alternative, and the tax-payer paid whichever ever was the higher. From Jan. 1, 1946, E. P. T. reverted to 60 per cent. The following amounts were realised from E. P. T. in the financial year indicated: 1939-40, £81,000; 1940-41, £72,780,000; 1941-42, £247,803,000; 1942-43, £347,074,000; 1943-44, £467,712,000; 1944-45, £174,699,000. (The yield of the Defence Contribution was, relatively, negligible, averaging for the six financial years 1939-40 to 1944-45, £28,430,000.)

Exchange (Fr. *changer*; It. *cangiare*, *cambiare*, *cambire*, to barter or exchange). term applied to many transactions and to the circumstances connected with them, all of which have, however, the basal idea of the giving of one thing—material, labour, or rights—for another. The *Exchange of Lands*, in law, is a mutual or reciprocal grant of equal interests in land, the one in consideration of the other, as a grant of a fee simple in return for a fee simple. Facilities for E. by parties under disability or tenants for life are now provided under the Inclosure Acts and the Settled Land Acts. In eccles. procedure, the *Exchange of Livings* is conditioned by the consent of the bishops and patrons of both the benefices concerned. It is effected by resignation, and no monetary compensation for inequality in the value of the livings may be offered or accepted. *Exchange in Commerce* is used in various senses of the giving or receiving of money or of one currency in return for an

equivalent sum in another currency (see **EXCHANGES**, **FOREIGN**); the giving or receiving of money in one place for a bill providing the payment of an equivalent sum in another place; the rate at which this documentary transfer of money may be made, etc. The *Exchange* is applied to the assemblage of merchants, bankers, and brokers for the transaction of business in commodities, stocks, bonds, bills, etc., and also to the place in which they meet for such purpose, e.g. the Royal E. in London, the Bourse in Paris, and the Stock E. in New York. A *Deed of Exchange* is a legal document recording the transfer of lands, etc., and is provided for by the Real Property Act of 1845.

Exchange, Bill of, see **BILL OF EXCHANGE**.

Exchanges, Foreign, term applied to the settlement of the balance of indebtedness arising out of the carrying on of trade between different countries. This settlement involves much complicated business, since the balances are continually changing both in amount and direction, and, in order to effect the remittance of money in the most economical manner, it is necessary to ascertain the relative values of the currencies of many different countries. The basic theory of exchange is that only the balance into which the financial transactions resolve themselves shall be liquidated, this being done when possible by a transfer of credit, or, failing that, of gold. The subject of F. E. has an important bearing upon the choice of a monetary system, since if, in a given case, this is based upon an enforced depreciated currency, the exchange operations of that country with others are bound to be prejudicially affected. F. E. is at its simplest when 'at par,' i.e. when a sum of currency in one country is able to buy a bill for a sum of currency in another country, the two sums being equivalent to the same amount of bullion of a given standard. The discharge of international liabilities may be performed in three ways: (1) By means of the actual remittance of bullion or cash in coin. This method is little used owing to its costliness, since the expense of conveyance and the premium for insurance materially increase the amount of the remittance. (2) By means of the remittance of international securities, i.e. certain well-known gov. bonds and other securities or stocks and shares, the certificates of which are accepted in payment of international debts. This method is also expensive since brokerage charges have to be added to the cost, and the margin between the buying and selling price is also a loss. (3) By the remittance of bills of exchange. This is the cheapest and easiest method of F. E. and consequently the most common. Those bills, which may be of various currencies, need not be drawn upon the country to which they are remitted, e.g. it may be most profitable to effect a remittance from London to Paris by means of an Amsterdam bill drawn upon Paris. The principle upon which this business is transacted may be roughly illustrated thus: A, a merchant in London, has to

make a remittance to Paris to a merchant, B, in that city. B, in order to save A the risk and expense of transmitting cash, draws a bill for the amount due upon him. B sells this bill to C, another Paris merchant, who sends it in place of cash to settle his account with D, in England. At the expiry of the time the bill has to run, D takes it to A, and receives cash in exchange for it, while the possession of the bill marks A's discharge from B's debt. The bills, which are any first-class ones on the market, are commonly drawn at three months' date.

F. E. and the market price of bills of exchange are affected by two main causes, viz., the relative indebtedness of the two countries involved, and the rate of discount ruling in each. The first cause is dependent upon the law of supply and demand, since if one country is considerably in debt to the other, the price of bills upon the creditor rises in the debtor's market owing to the competition of merchants who are trying to buy bills to remit, while in the creditor's market the absence of demand for bills upon the debtor tends to lower their price. The second factor is really the value or price of money in the two countries, since a high rate of interest in one country will tend to make foreign merchants buy bills upon it, and the increasing demand again leads to an increase in price. When the price of bills upon a country goes beyond a certain height, known as the specie, or gold point, i.e. the point at which the buyer pays to the seller a premium equal to the amount of the cost of transport, gold begins to flow in, as the debtor then prefers to make payments in cash. The turning of F. E. in favour of a country is marked by the approach of this point. The inverse position is produced by the fall of the price below par. So far as F. E. in England are concerned, where the rates of exchange are quoted in foreign money, high rates are favourable to England; but when the rates are quoted in Eng. money, low rates are in England's favour.

The First World War played havoc with the ratio of F. E. This was only natural when it is realised that the trade and commerce of the whole world were affected, and that the greatest commercial nations in the globe were active belligerents. The natural flow of trade and consequently of bills of exchange between the nations was severely impeded, and in the case of the enemy countries stopped altogether. The inflation of the currencies of Germany and Austria by means of the free use of the printing press contributed to the fact that the currencies of these countries had for some time not even an external nominal value. With regard to internal value, it is worthy of record that when the new Reichsbank was formed in Germany, it called in all its previous circulation and converted it into Reichsmarks at the rate of one trillion Marks for one Reichsmark.

F. Es. were also much disturbed in the decades following the First World War by the abnormal influence of huge

indemnity and war debt payments and by attempts to secure transitory commercial advantages through deliberate currency depreciation. In Britain the machinery of the Exchange Equalisation Fund, which was estab. in 1932, contributed to the removal of difficulties caused by rapid fluctuations of Es. But towards the end of 1938 the Fund, having sustained heavy losses of gold in defence of the currency, had to be strengthened by increasing the Bank of England's fiduciary issue to a record issue, a sum of £200,000,000 of gold, valued at the old parity price of 85s. per fine oz. (equivalent to £350,000,000 at the then current price), being transferred to the Fund from the issue department of the Bank.

On the outbreak of the Second World War, in Sept. 1939, the gold reserve of the Bank of England was transferred to the Exchange Equalisation Fund or Account as part of the general plan for strengthening the country's financial resources abroad. Under Defence (Finance) Regulations issued in that month, United Kingdom residents holding U.S.A. dollar securities were required to register their holdings with the Bank of England and thereafter the Brit. Gov. gradually acquired all Brit. holdings of U.S.A. railroad and industrial dollar securities at fixed sterling prices, the purpose being to conserve all the dollar exchange possible for financing war purchases in the U.S.A.

The Exchange Control Act, 1947, purports to put in legislative form the obligation which rested on Britain, as a result of the series of agreements with the U.S.A. associated with Bretton Woods (q.v.) and the Amer. loan to Britain of 1946, to free current exchange business from control while at the same time, in view of the likely course of the Brit. balance of payments, maintaining a necessary restraint upon movements of cap. There was no dispute in the debate on the Bill about the necessity for the gov. to seek the powers conferred by the Bill; the argument in the House of Commons concerned rather their duration. The Bill was represented by the chancellor of the exchequer as an indispensable weapon for safeguarding our balance of payments by husbanding our exchange resources for a long time. 'Sterling,' he said, 'was a great international currency, and the Government sought to make it greater. They aimed to maintain its stability, and the Bill was an essential weapon to extend its uses. The goals to which we were moving were a more assured stability in our balance of payments and our rate of foreign exchange, and greater expansion of our trade.' (In the House of Commons, Nov. 28, 1946.)

Exchequer (Norman-Fr. *eschequer*). The name of the king's court of revenue is taken from the fact that in early times the accounts were reckoned upon a chequered cloth, resembling a large chess-board, round which the officers sat. The Eng. and Fr. words are allied to the Lat. root *scac*, which appears in *scaccum*, a chess-board, and *scaccarium*, the Court of E., and also the chequered cloth used

there. It appears that the sums of money received by the treasurer were scored upon the squares of this cloth with counters, the process being suggestive of a game of chess. The name only began to be used about the time of Henry I., and previous to the use of the chequered cloth as an aid to calculation business was transacted by means of 'tallies,' or notched sticks.

Exchequer Bills, *see* BILL of EX-CHEQUER.

Exchequer Bonds, *see* PUBLIC DEBT.

Exchequer, Chancellor of the, head of the Treasury Department, being one of the most important members of the cabinet in the Brit. Gov. He must be a member of the House of Commons, and acts as the first finance minister of the crown, having the duty of preparing the annual budget, *i.e.* the estimates of revenue and expenditure, and the imposition or removal of taxes in order to meet deficit or surplus, and the management of all matters relating to public money. With the exception of certain times, when his place is taken by the lord chief justice of the King's Bench, the chancellor acts as one of the lords of the treasury. The office of C. of the E. may be held by the Prime Minister, if the latter is a member of the House of Commons, and the combined office has been held by Wm. Pitt (1804-6), George Canning (1827), Sir Robert Peel (1834-35), and William Ewart Gladstone (1873-74 and 1880-82). The chancellor was originally an under-treasurer, who checked the proceedings of the lord high treasurer. He also had important judicial functions, sitting on the 'equity side' of the Court of Exchequer. These disappeared in the eighteenth century, the last C. of the E. who sat as a judge being Sir Robert Walpole, who gave a decision in this capacity in 1735.

Exchequer Court, one of the three great courts of the realm, having the functions of a court of revenue and a court of common law. In its latter capacity it is now merged in the King's Bench Div., but in its former it deals with all matters relating to the revenue of the kingdom. It is connected with the Treasury, and its operations are supervised by the Audit Office.

Excise Duty, duty imposed on home-produced articles, usually on articles of stable consumption, such as beer and spirits, so that the estimated revenue can be relied upon. It is sometimes levied on certain commodities as a countervailing tax to a customs duty on imported goods of the same nature, when the latter tax is not imposed, in order to protect the home product. If an article is manuf. both at home and abroad, a customs duty tends to exclude the foreign article from the home mkt.; an E. D., by taxing the home product as well, makes that particular article as full a source of revenue as possible. All licences come under the heading of excise, excepting those for motor vehicles. E. Ds. were first imposed by the Long Parliament in 1643 to raise funds for the Civil war against Charles I. and it was levied on wine, beer,

tobacco, and other articles. In 1936-37 E. D. yielded £104,000,000, in 1938-1939 £114,200,000. The yields for the years ended March 31, 1943, 1944, and 1945 were respectively: £412,529,000, £469,878,000, and £484,990,000. The average receipts under individual heads for those three financial years were: beer, £253,877,000; spirits, £53,078,000; liquor licences, £4,073,000; other licences (auctioneers, hawkers, etc.), £360,000; saccharin, £2,407,000; entertainments, £40,196,000; matches, £4,822,000 and purchase tax £100,318,000.

Excitants, *see* STIMULANTS.

Exclusion Bill (1679-80), measure brought forward by Shaftesbury to prevent the duke of York (afterwards James II.) from coming to the throne, owing to his adherence to the Rom. Catholic faith. It was three times passed by the Commons, but on each occasion Charles II. dissolved Parliament.

Excommunication (Lat. *ex*, out of, from; *communio*, communion), exclusion by formal sentence of offenders from the rights and privileges of the religious community to which they belong. The hist. of the practice of E. may be traced through pagan analogies. Heb. customs, primitive Christian practice, medieval and monastic usage, and modern survivals in existing Christian Churches. That the Christian Church has always laid claim to the powers of E. is shown by such early writers as Irenæus, Cyprian, Basil, Ambrose, etc., who give proof of the existence of two degrees of E.; the first involving exclusion from the participation in eucharistic service, and the second involving 'exclusion from all church privileges.' The former was the usual punishment for light offences, the latter the penalty for graver scandals. The necessity for church discipline did not cease to be recognised at the Reformation, though its administration would seem to have passed through a period of some confusion. In some cases, the old episcopal power passed into the hands of the civil magistrate, in others it was conceded to the presbyterial courts. In the Anglican Church the right of excommunication is in the hands of the bishops, though it is never exercised. The reformers claimed the power of E., and Luther insisted on the right as inherent in the ministers of the Church. Calvin, too, asserted that it was of the very essence of the ministry. At first civil disabilities followed E., but later this ceased to be the practice. In England, until 1813, persons excommunicated were debarred from bringing or maintaining actions, from serving as jurymen, or from practising as attorneys in the courts of the realm; but all these disabilities were finally removed by statute. E. renares a culprit and punishes his conduct, and by thus warning, endeavours to recall him to salvation. Whether the power of E. rests in the Church or the clergy has been an important question in the hist. of Eng. and Amer. Churches. Archbishops, while exercising visitatorial jurisdiction, bishops within their sees, and heads of religious orders within their own

communities possess the power to issue E. (subject to appeal to the sovereign), but the power can never be delegated to laymen. In contemporary Eng. Free Churches the purity of the Church is commonly secured by the removal of persons unavailing for membership by a vote of the responsible authority. In the Rom. Church E. is either *ferenda sententia*, when the intervention of judicial process is required to attach it to a given person; or *latæ sententia*, when a crime carries E. with it automatically. An excommunicated person may be *tolerandus*, who is cut off from the spiritual benefits of the Church only; or *non-tolerandus*, against whom the faithful are warned. These may not participate in any Church functions or exercise any juridical or teaching office. E. in certain cases is reserved in varying degrees of stricture to the pope. See Schilling, *Der Kirchenbann nach canonischen Recht*, and Von Kober *Der Kirchenbann*; T. Erasmus, *Nullity of Church Censures*, 1659; H. Thorndike, *The Church's Power*, 1856.

Excretions, eliminatory products of such organs as the skin (*q.v.*), kidneys (*q.v.*), intestines (*q.v.*), etc., viz. sweat, urine, feces, etc. See also RESPIRATION.

Exe, riv. of England, which rises in Exmoor. It flows through the cos. of Somerset and Devonshire in a southerly direction, its chief tribs. being the Barle, Loman, Batham, Culm and Creedy. Its course of 54 m. is through beautifully wooded and picturesque country. The tns. on its course are Dulverton, Topsham, Exeter, etc. Its estuary is navigable for 8 m., and as it is a mile in width vessels of large size can enter. A canal connects it with Exeter.

Execution means the enforcement of judgments and other proceedings analogous to judgments of courts of law in civil actions. The term denotes the process by which a party is put into possession of that to which the judgment declares him to be entitled. It is generally effected by a writ directed to the sheriff or other proper officer, commanding him to seize goods or take other compulsory proceedings to carry out the judgment. In the simplest form of judgment the defendant is ordered to pay the judgment creditor *forthwith*, and the latter may at once proceed to E. Under a writ of *fi. fa.*, which is the most ordinary form of E., the sheriff is directed to 'cause to be made' (*fieri factas*) out of the goods and chattels of the debtor the sum recovered by the judgment, together with interest at 4 per cent and to bring the sum into court for payment to the judgment creditor. Armed with this writ the sheriff may enter the premises of the debtor and seize what property of the debtor he can find, with the exception of wearing apparel and bedding, tools and implements of trade to the maximum value of £5. He may then sell the goods seized, including leases of land, but not freehold estates of inheritance, for these latter go to the heir of the debtor. Where goods seized are claimed by a third person the sheriff must take

out an interpleader summons upon which an issue to try the title to the goods will be directed. (For the application of a writ of *elegit* to enforce E. against the debtor's lands, see ELEGIT.) In many cases the ordinary processes of the common law will not avail to enforce a judgment, e.g. against a share of the proceeds of land to be, but not yet sold, or against rents. In such cases the court may in its discretion appoint a receiver by way of what is called equitable E. Another mode of equitable E. is to obtain a charging order against a partnership interest. E. against debts owing to the judgment debtor is enforced by process of attachment of the debts (see GARNISHMENT). Other writs of E. are of *attachment (q.v.)*, of *possession*, or to put the plaintiff into possession of land recovered in an action, and of *delivery* to enable the plaintiff to get possession of property other than land or money. E. is also used to denote the giving effect to the sentence of a court of criminal jurisdiction, and in this sense usually means the E. of sentence of death (see CAPITAL PUNISHMENT). For the meaning of E. in relation to deeds and wills, see DEED; WILL.

Executive. In every sovereign political society, or state, there must exist some person, group of persons, or body independent of all external control, with power to maintain the independence of the state against aggression from without and to preserve order within. Such person or body is known as the E. Non-sovereign political societies may also possess an E., but in all such cases, as e.g. in the case of colonies and protectorates, that E. acts under the active or latent control of the E. of some other state or suzerain power. E. powers are to be distinguished from legislative, although both may be vested in one person or group of persons. The function of a legislature is to make laws, but the functions of the E. are (1) to give those laws legal effect, and to enforce them where necessary, and (2) to determine the policy of the state in its foreign relations. In the case of an absolute and despotic monarchy, all the executive powers reside in one person who may or may not be assisted by a council of chosen advisers. In a limited constitutional monarchy, the E. power resides collectively in the crown and its responsible ministers or cabinet (see CABINET and CROWN). In federal states the E. powers reside in some central body composed of representatives of the various federated bodies. In the Eng. Crown (colonies a nominated governor or governor and council wield the E. powers (see COLONIAL LAW; CROWN COLONIES).

It is to be observed that the interdependence of the legislature and E. of those representative govs. of the present day which possess what may be termed a 'parliamentary E.' is such that the E., far from being distinct from the legislature, is, in reality, chosen from among the members of the latter, and not only appointed but dismissed by the elective portion of the legislature. In the case of those representative govs. where the E.

power is in an emperor and his ministers, or a president and his cabinet, the E. is appointed by the legislature, and is therefore a 'non-parliamentary E.'. Under the constitutions of England, Belgium, Italy, and the Fr. republic there exist parl. Es., while examples of non-parl. Es. are to be found in the United States and the pre-1939 Ger. empire. For an exposition of the various prerogatives of the E. in England, see CROWN; and for the relationship between the E. and Parliament, see CABINET. See also CONSTITUTION.

Executor. The person or persons to whom another person commits by his last will the carrying out of his testamentary wishes or are his E. or Es. An E. can only be appointed by will or by codicil. But he need not be termed an E. in the will if it can be inferred from the powers and duties vested in him by the testator that he was to be E. It is usual to appoint two Es., although one is sufficient; any number up to and including four may be appointed. An E. may be a legatee: thus a child or wife to whom the whole or a portion of the estate is left may be appointed sole E., or one of two Es. If an E. has not been appointed in the will, or if the E. be dead, or does not wish to act, the residuary legatee nearest of kin to the deceased, or a legatee, is entitled to act and administer the will. A person appointed E. may accept or refuse office, but he will be taken to have accepted if he performs acts of authority over the estate or property from which it may reasonably be implied that he meant to accept, and similarly his refusal may be implied from his abstaining from intermeddling in the administration. The authority of an E. dates from the moment of the testator's death. The will is the only source of his title to act, but probate of the will is the only evidence of that title. Before probate an E. may validly perform any of his executorial functions, such as receiving debts or paying legacies, but he can maintain no action at law until he takes out probate. Where there are sev. Es. they are not bound to act jointly, and most executorial acts are valid even if done by one E. separately. The duties of an E. are to bury the deceased in a fitting manner, but without incurring unreasonable expense: then he should prove the will and take out administration. The other duties are, within a convenient time after the testator's death, to collect the goods comprised in the estate, make an inventory of the personality, advertise for creditors and debtors, and deal with the personal effects as directed by the will. He has a year in which to pay or transfer the legacies: but if the solvency of the estate is beyond question, he should pay or transfer them before the end of the year, and may be sued if he does not do so. At the end of his year he must submit an account of his dealings to the proper authorities. These dealings will, in general, be the payment of debts and legacies in the order laid down by the rules of equity.

Since the Land Transfer Act, 1897, real

property also vests, in the first instance, in the E. or other personal representatives of the deceased, whether the deceased died intestate or not: and an E. may sell the real estate if necessary for the purpose of paying debts, but where not required for debts the E. must transfer the real estate to the devisee, or, if not devised, to the next of kin. An E. should be careful not to mix the moneys belonging to the estate with his own, as he may be charged interest on it. Interest is charged on all moneys received by an E. and not properly applied, or which have been allowed by him to lie idle. If a stranger, i.e. one not constituted E. by the will, assumes the functions of an E. by intermeddling in the administration, he is called in law an E. *de son tort*, i.e. an E. of his own wrong. Such acts of intermeddling do not include the burial of the deceased, or the preservation of the goods, or payment of funeral expenses, or other acts which may appropriately be termed acts of salvage or charity. An E. *de son tort* is liable for such assets as come into his hands, and may be sued as if he were the rightful E. There is no remuneration allowed to an E. save as expressly provided by the will; but in Canada the E. is allowed 5 per cent commission on the money passing through his hands.

Executory. In the Eng. law of real property an E. interest is a future estate or title to land, which is said to arise of its own strength when the contingency on which it rests is fulfilled, and to put an end to prior estates or interest. *e.g.* in an ordinary marriage settlement of land, the settlor, a day or two before the marriage, conveys land to trustees to hold for him until the marriage takes place, and after that to such other uses or trusts as may have been agreed upon between the spouses or their parents. In the law of contract, an E. consideration (*q.v.*) means a future as opposed to a present consideration, or a promise as opposed to an act.

Exedra, in architecture, term applied to an open recess, such as a niche containing a seat, the space within an oriel window, or the spaces between the buttresses of a cathedral.

Exegesis, term meaning exposition or explanation applied by the Gks. to the interpretation of the Holy Scriptures. Hermeneutics is the term frequently used as applying to the discovery of the meaning of the Bible, but E. is distinguished from it as more properly covering the exposition and application of Holy Scripture to faith and conduct.

In a general sense, however, the term has now come to be applied to the science and art of the elucidation of Scripture. E. includes both the study of the text and the doctrinal bearing of same, with the conclusions that may be deduced from it. Thus, it may be seen that E. requires a wide and accurate learning as well as a certain amount of intuition of an intellectual and spiritual nature. Amongst the great exegeses may be mentioned Origen, Augustine, Calvin, and Meyer, and all of these have been distinguished for

their scholarly attributes and spiritual insight. The materials for the critical study of the O.T. are scanty as compared with the New, and the difficulty of attaining definite conclusions is therefore greater. MSS., versions and quotations are the different kinds of critical materials ready to the hand, and here again the student of O.T. hist. is very slenderly equipped.

The two main currents discovered in the hist. of E. are the literal and allegorical. The tendency to seek an underlying sense in writings of venerable age come to be looked upon as authentic and weighty, if not inspired, gave rise to the allegorical method, of which the attractiveness is very great, as it gives full scope for the penetrating of original minds, and is thus more popular than the literal method. Nevertheless, the old theory of verbal inspiration is no longer held by the intelligent scholar, and the nineteenth-century exegetes were the first to establish a satisfactory critical *modus vivendi* by insisting on the human as well as the divine element in the Scriptures. The Jewish E. of the O.T. is seen in the Talmudical writings, and the Hellenic Jews were responsible for seeking to make a reconciliation by means of allegorical interpretation, between the traditions of Hebraism and the results of Gk. philosophical thought. Philo was the greatest master of this art, and he formulated the twofold teaching in the Pentateuch—the verbal and the figurative. The Alexandrian school also adopted this system, and the same influences show themselves, though to a lesser extent, in the writings of Hippolytus and Augustine. As opposed to these, the Antiochene school, represented by Theodorus, Lucian, Diodorus, and Chrysostom, shows a marked contrast. These writers aimed at a grammatical and historical criticism, which at times, however, degenerated into an unspiritual and bare interpretation. Exegetical work was practically at a standstill during the Middle Ages, except for some collections and views of the fathers: but Nicholas of Lyra made a transition to the modern period in his *Postille*, emphasising the literal sense; and the humanists, as personified in Erasmus, began to make serious and systematic philological investigations. The names of contemporary exegetes are too numerous to mention, since a continuous chain has laboured at the elucidation of the Scriptures on sound scientific lines. Alford, Lightfoot, De Wette, Perowne, Hitzig, Oehler, Keil, Lagrange, etc., are among the number. For E., see E. Hatch, *Libbert Lectures*, 1888; and A. Cave, *Introduction to Theology*, 1896. For fullest and latest information, also see *The Cambridge Bible for Schools and Colleges*, and the *International Critical Commentary*.

Exelmans, Remy Joseph Isidore, Comte (1775–1852), marshal of France, who fought under Murat in the Sp. campaign, during which he was taken prisoner and sent to England. He escaped in 1811 and joined Napoleon's army in Russia in 1812, being made a general of div. for his bravery. He was exiled from France at

the fall of Napoleon, but allowed to return in 1823.

Exempla, or Exemplar, short story with a moral, a kind of fable (q.v.).

Exequatur, in international law, the term applied to the document issued by the state to which a consul is accredited, confirming his appointment. This appointment has, of course, previously been made by commission or patent issued by the consul's own state. The foreign state is at liberty to decline an E., or to withdraw it when issued.

Exeter, situated in lat. 50° 43' N., long. 3° 31' W., at the head of the estuary of the R. Exe, 9 m. from the S. coast of Devon, and 172 m. from London, besides being a city and co. of itself, is the administrative cap. of Devonshire, an episcopal see, and the seat of the Univ. College of the S.W. of England. As a mercantile and residential centre, holiday resort and minor port at the conjunction of many roads and of the W. and S. Regions of Brit. Railways, it retains much of its anct. dignity as the metropolis of the S.W. peninsula, formerly the Brit. kingdom of Dumnonia. Its origin has not been established. Inconclusive evidence suggested that a tn. may have existed here in the third century B.C. That 'Isca of the Dumnonii' was well estab. by A.D. 55 has been proved by excavation. Sixty years later it was known to Ptolemy the geographer in distant Alexandria and continuous habitation from his day to ours is a dominant feature of the city's story. St. Boniface, the apostle of Germany and a native of Crediton, received his early education in an Exeter monastery about A.D. 690, by which time the Saxon incursions had extended to this dist. For two centuries the Britons and Saxons shared the city, jointly defending it against the Danes in 877 and 894. In 928 Athelstan met the Witan here and expelled the remaining Britons. In 1003 the place was sacked by Sweyn. At the Norman Conquest, E. was already an anct. city with prescriptive privileges, among which Domesday notices an exemption from geld save when London, Winchester, and York, the other regional caps. of the country, might be taxed. The tn. of those days, enclosed by a wall of mixed Roman, Saxon, and medieval workmanship (now attenuated, but still continuous save where the four main gates have been demolished within the last 150 years), covered a polygonal area of one half by one third mile, upon a 170-ft. hill E. of the riv. In 1067, with Harold's kin as its guests, E. defied the Conqueror, but submitted after a siege of 18 days. Within the highest N.E. angle of the tn. wall, Wm. then raised the strong motte-and-bailey castle of Rougemont, so named from its red masonry and earth, noticed by Shakespeare in Richard III., act iv., scene ii. The earliest allusions to municipal gov. here recall Rom. and Saxon administration: it is not until about 1200 that a mayor is noticed. The extant city charters commence with a confirmation by Henry II. of customary rights enjoyed under his grandfather,

Henry I., together with the privileges of the Londoners. Other grants were received from twenty-two sovereigns or princes between Richard I. and George III. Henry VII., in token of his gratitude for firm resistance to Perkin Warbeck, gave the State Sword and Cap of Maintenance which are still borne before the Mayor. Henry VIII. in 1537 made E. a County incorporate, independent of Devonshire, with liberty to elect its own Sheriff. In 1549 it withstood the Prayer-Book Rebels. In 1643 it was occupied by Prince Maurice for King Charles. In 1646 it surrendered to Fairfax. Wm. III. spent eleven days here after his landing at Brixham in 1688.



John H. Stock

THE GUILDHALL, EXETER

The Guildhall, home of the anct. City Court, is documented from 1160 and believed to be the oldest municipal building in the country. Rebuilt in 1330 and 1488-70, the date of the fine timber roof, it has a famous Elizabethan portico with upper chamber athwart the pavement and contains much good woodwork, portraits including two by Lely of Princess Henrietta ('Madame'), born here in 1644, and of George Monk, duke of Albemarle, whose maternal grandfather was thrice mayor; the city regalia and silver ware. At a little distance the handsome fifteenth-century Hall of the Tuckers commemorates Exeter's woollen trade and her many corporate guilds. The Cathedral church of St. Peter, around whose foundations exist remains of the Rom. baths and Saxon conventual buildings, springs from

a monastic church estab. by Athelstan in 932 and rebuilt by Canute in 1017. The see was removed hither from Crediton in 1050, when Edward the Confessor and his Queen personally enthroned Loofric as first bishop of Exeter. As now seen, the noble structure is most remarkable for its massive transeptal towers of 1112-33, which leave unbroken the lofty vault over nave, choir and sanctuary, 100 yds. long from E. to W.; for its unique fourteenth-century organ-screen, fine minstrels' gallery, episcopal throne, tombs of the medieval bishops, and sculptured W. screen. In 1942 a Ger. bomb destroyed the Chapel of St. James in the S. choir aisle, besides doing other grave damage to the Cathedral and adjacent Palace. The Benedictine Priory of St. Nicholas, in the Mint, contains good thirteenth-century work.

Intensive bombing on May 4, 1942, destroyed 9 and damaged 22 churches; destroyed 1800 and damaged 17,000 other buildings. Three devastated areas deface the city centre, with other damage dispersed over a wide area. The Probate Registry perished with all its contents, as did Bampfylde House, Norman House, Chevalier House and the medieval Hall of the Vicars Choral. The City Library was gutted by fire. Much damage was done to Southernhay, Queen's Crescent and York Road and also to St. Sidwell's Church, most of the Banks, St. Luke's College and the Heavitree Hill Hospital. Nevertheless, E. retains a remarkable wealth and variety of good buildings belonging to all periods from the Middle Ages to the Regency. Her most famous accumulations of historical manuscripts also survived: the *Exeter Book* of A.-S. poetry, *Exeter Domesday Book*, the episcopal and chapter archives in the Cathedral Library, the copious city archives, with other collections belonging to the city library, and the co. Records in the Castle. In the bombed area adjoining South Street, in ground that probably comprised one of the central *insule* of the Rom. city of Isca, excavations in 1946 uncovered two interesting wooden houses of the first Rom. occupation. Finds of Samian and coarse pottery of pre-Flavian character enable the period of occupation to be fixed at about A.D. 55-75. Beneath the remains of St. George's Church the walls and flooring of a colonnaded stone building were found of the same period extending up to and below South Street. The discoveries give a good indication of the alignment of the Rom. city. Fragments of walls found seem to establish that the one-time Saxon Church was a building some 35-40 ft. long and about 15 ft. broad. It is of interest as the sole example of the period known technically as Devon.

The Univ. College of the S.W. arose from an educational enterprise founded jointly by Exeter and the co. of Devon as a Royal Albert Memorial. It was incorporated under its present title in 1922 and then obtained its first Treasury grant. Besides premises in the city, it has acquired a park of 120 ac. on the N.

outskirts and erected therein halls of residence, laboratories and a library. It prepares men and women for the examinations for the external degrees of the Univ. of London. St. Luke's College, founded in 1838 as a Church of England Training College, the oldest foundation of its kind in the country, was partially destroyed in 1942. It was reopened in 1945 and prepares about 200 students, chiefly for the Ministry of Education Certificate. The Royal Albert Memorial Museum and Art Gallery in Queen Street contains good collections illustrating zoology and local archaeology.

The Port of E. extends down-river to the sea, and coastwise eastward to the Axe and westward to the Teign. In the 5½-mile canal stretching from the tn. quays to Topsham, E. has the earliest lock canal in the country, though much deepened and widened since its construction in Elizabethan days. The prin. industries are paper-making, brewing, flour-milling, tanning, iron and brass founding and light engineering. The parl. bor. of 1705 ac. returns one Member. Pop. (1947) 75,290.

Exeter, tn. of New Hampshire, U.S.A., cap. of Rockingham co., 12 m. from Portsmouth, at which many eminent men were educated, there are some fine colonial homes. It was at Exeter that the first independent state gov. was formed. It contains the Phillips Exeter Academy. Pop. 5300.

Exeter, Peerage of. The titles earl, marquess, and duke of E. have been borne by members of the families of Holland (Holland), Beaufort, Courtenay, and Cecil. The first duke of E. was John Holland, son of Thomas (d. 1360). He was created duke by Richard II. in 1397, and as the king's half-brother held a high position at court, but was degraded from his rank by the Parliament of Henry IV. After plotting against Henry's life, he was beheaded in 1400. The second duke, Thomas Beaufort, was created in 1416. He was the youngest son of John of Gaunt by Katharine Swynford. The title expired on his death (c. 1426). In 1413 John Holland, son of the first duke, was created duke of E. under Henry VI. His son, Henry, also held the title, but died without sons (c. 1473). He supported Henry VI. in the Wars of the Roses, and was attainted (1461). In 1525 the earl of Devon, Henry Courtenay, was created Marquess of E., the title becoming extinct on his execution (c. 1538), though sometimes given to his son Edward. The earldom of E. was bestowed on Thomas Cecil, second Lord Burleigh, 1605, son of Wm. (d. 1598), by James I. His direct descendants carried on the title. Henry, the tenth earl, becoming Marquess of E. in 1801. (Tennyson's *Lord Burleigh* is founded on an incident in the life of Henry, 1754-1804.) The present (fifth) marquess (William Thomas Brownlow Cecil), is a lineal descendant.

Exeter Book, or Codex Exoniensis, a unique manuscript of A.-S. poetry, in the possession of the dean and chapter of Exeter Cathedral. It was presented to

the library of the cathedral by Leofric, who was bishop of Exeter, 1050-71, and probably dates from the first half of the eleventh century. It contains 246 pages of vellum, upon which, besides some legal documents, are the original of the following poems: 'Crist' and 'Guthlac,' probably both by Cynewulf; 'Azarias,' an independent text of the Song of Azarias in the Julian Calendar; 'Daniel'; 'Phoenix,' probably by Cynewulf; Cynewulf's 'Juliana'; 'The Wanderer,' a beautiful dramatic lyric; 'The Gifts of Men'; 'The Father's Teaching'; 'The Seafarer,' a haunting description of the painful and yet voluntary exile of the seaman; 'The Spirit of Men'; 'Widsith,' probably the oldest poem in the book; 'The Fates of Men'; 'Gnomic Verses,' containing rather trite philosophy; 'Wonders of Creation'; 'The Rime Song'; 'The Panther'; 'The Whale,' and 'The Partridge,' all three fragments of an old Eng. Bestiary; 'Address of the Soul to the Body'; 'Deor'; 'Riddles,' fifty in number, of which many are probably by Cynewulf; 'The Wife's Complaint'; 'The Last Judgment'; 'A Prayer'; 'The Descent into Hell'; 'Alms'; 'Pharaoh,' an incomplete 'Paternoster'; a didactic fragment and some different forms of two 'Riddles'; 'The Husband's Message'; 'Ruin,' and about forty more 'Riddles.' The MS. has been described by Humphrey Wanley in his *Catalogue* (1705), and by J. J. Conybeare in 'Account of a Saxon MS., read 1812 and printed in *Archaeologia*, 1811. It was transcribed by Robert Chambers in 1831 (Brit. Mus. Addit. MS. 9067), and first printed by Benjamin Thorpe in 1842. The poems are now printed in Grein's *Bibliothek* (vol. iii.); Pfeiffer's *Germania* (vol. xix.); and Israel Gollancz's ed., for the Early English Text Society.

Exeter College, Oxford, founded in 1314 by Walter de Stapledon, bishop of Exeter. Twelve scholars studying philosophy were supported at Oxford by the income of the rectory of Gwinear, Cornwall, which he had conveyed for this purpose to the dean and chapter of Exeter. Stapledon housed them in Hart Hall and Arthur Hall, in the par. of St. Peter in the E., but in 1315 removed them to buildings on the present site, known as Stapledon Hall. In 1404 Edmund Stafford, bishop of Exeter, added two fellowships and gave the college its present name, and the endowment was further increased by Sir Wm. Petre in 1565, and Mrs. Shiers in 1770.

Exeter, or Exon Domesday, part of the great survey of England ordered by Wm. the Conqueror. The *Exeter Domesday*, which is preserved at Exeter, contains the original returns made by the twelve local jurors sent from each hundred in the cos. of Wiltshire, Dorset, Somerset, Devon, and Cornwall. It includes the details, omitted from the great *Domesday Book*, of the tally of live stock. It was pub. in 'record type' in 1816, in a supplementary vol. to the gov. reprint of *Domesday Book*. See DOMESDAY BOOK.

Exeter Hall, large building which formerly stood on the N. side of the

Strand, London, originally built in 1831 as a proprietary estab. to be used for the meetings of religious and charitable societies. It was purchased by the Young Men's Christian Association in 1880.

Exhibit. In law a document shown to a witness while giving evidence and sworn to by him, or shown to a deponent while being sworn previous to making an affidavit in which it is referred to.

Exhibition. This term has come to be applied to the display of goods to the public for promoting trade, and denotes in a general sense a public show. The first E. of any national importance was that credited to the Marquis d'Avèze at Paris in 1798, consisting of a collective display of the art factories of France, including those of Sévres and the Gobelins. In 1801, a second E. of the same kind was held, and a third of a greatly improved kind in 1803. A fourth was held in 1806 and attracted 1422 exhibitors. This concluded the number of Es. held in France till after the fall of the empire; but a fifth was held in Louis XVIII's reign, and others at various intervals. The impetus given by the Paris display was felt all over Europe, and E. began to be held in all the chief cities between 1820 and 1840, including the United Kingdom and Ireland. These E., however, were all of a smaller nature—more or less confined to the products of the particular country in which they took place; and the first great International E., promoted by the Society of Arts, was held in London in Hyde Park, where a site was obtained for the erection of the Crystal Palace, designed by Sir Joseph Paxton, at a cost of £193,168, under the presidency of Prince Albert. This E. was opened by Queen Victoria in 1851. The building was composed entirely of glass and iron, and was afterwards removed to Sydenham, where it stood until destroyed by fire in 1936. It remained open for over five months, and attracted 6,170,000 people, the money drawn amounting to £505,000, of which sum £150,000 was profit, and was invested in the purchase of an estate at S. Kensington on which numerous institutions have been placed. In 1862 the second great International E. was held in London, in a building at S. Kensington, but the outlay of this one was so great that the receipts did not cover it, and it resulted in a deficit of about £10,000.

Vienne held an international E. in 1863, but was surpassed by the Paris E. of 1878, which made an advance in magnificence and size upon all previous displays. Paris again excelled all its predecessors from this point of view in 1889 with its Universal E., the Eiffel Tower being one of its chief attractions, and again in 1905 the Paris E. was on a scale vast enough to mark worthily the completion of the century, nearly every civilised nation in the world being represented.

In later years, important Es. were held in Glasgow, New York, and St. Louis, and the Franco-Brit. E. held at Shepherd's Bush in London in 1903 was a great success. In the artistic taste and magnificence

of the buildings and the interest of their exhibits, this E. may be said to have vied with, if not gone beyond, the great Paris E. The Jap.-Brit. E. was held in the same place in 1910, and also proved a success. An E. was also held at Brussels in the same year; but the success of this was unfortunately marred by a serious fire, in which the Brit. section especially suffered.

Practically the whole year round there, is held somewhere in London an E. of a specialised nature, e.g. there are Rose, Chrysanthemum, and other Shows at the Horticultural Hall; Cattle, Horse and Dog Shows at the Agricultural Hall—where also may be seen the ann. Drapers' E., in addition to bakery, confectionery, brewery and other trade Es. Olympia is the setting for many interesting Es. organised by the great London newspapers, as well as for motor shows, advertising Es., international horse shows, and the magnificent spectacle of the Royal Tournament. During the Christmas holidays a Schoolboys' E. is held in London. But the greatest E. Great Britain ever undertook was the British Empire Exhibition held at Wembley, under the presidency of the Prince of Wales, and opened by the King on April 23, 1921. It covered a vast area of 216 acs., and the various buildings housed treasures amounting in value to many millions of pounds. Among the royal visitors were the king of Denmark, the kings and queens of Italy and Rumania. There was an average attendance of over 3,000,000 people during each of the summer months, and the closing of the E. was postponed until 1925. The most notable buildings were the Palaces of Art, Industry, and Engineering, the last-named being six times the size of Trafalgar Square. In this was a display of electrical, marine, transport, motor, and other engineering appliances, with rolling-stock from the great railways; here a power station generated and supplied all the electric light and power used throughout the E. Vast and beautiful pavilions represented the dominions and colonies—Australia, Burma, Canada, Ceylon, India, East, West, and S. Africa—as well as the Home Gov. Many visitors were attracted by the model coal-mine, cigarette factory, printing works, and other displays, while the Amusement Park and the Tattoo were immensely popular; in the first six months the Queen's Doll's House gained £20,000 for charity. In 1929 Spain, considered a backward country, had two Es., one at Barcelona and the other at Seville. The Barcelona E. was notable for the most beautiful electrically illuminated fountains the world ever saw.

The Brit. Empire E. held in Buenos Aires in 1931 showed a very modern tendency in its display of films, featuring many phases of industry. In 1931, from May to Nov., the Fr. held an exceedingly beautiful colonial Exposition at Paris to show the progress of the Fr. colonial empire. One of the many notable buildings was a reproduction of the famous temple of Angkor.

The most recent Brit. Empire E. was that held in Glasgow at Bellahouston Park from May to Oct. 1938. During that period no fewer than 12½ million persons visited the E., which, contrary to the usual experience, involved the promoters in no financial loss. The Brit. Industries Fair, held annually in London and Birmingham, is an E. for trade buyers from all over the world.

United States.—There have been many notable Es. in U.S.A. commercial hist. In 1876 was held at Fairmount Park, Philadelphia, the Centennial E. to celebrate the 100th anniversary of Amer. independence. The visitors numbered nearly 10,000,000, and the total receipts amounted to about £800,000. The most remarkable feature was the display of U.S. machinery. A World's Industrial Fair was held at New Orleans in 1881-85, but it did not meet with the same degree of success as the Centennial E. Then followed the great Chicago E. of 1893, held at Jackson Park, Lake Michigan, to celebrate the 400th anniversary of the discovery of America. A company with a cap. of £2,000,000 undertook the financial arrangements, and the central gov. at Washington allotted large sums for the purposes of foreign exhibits. The total receipts from admissions were £3,000,000, while the expenses were over £5,000,000, the difference, however, being made up by subscriptions and gov. grants. There have also been important international Es. at New York, Buffalo, Jamestown, San Francisco, and St. Louis in recent years, that at St. Louis being held to commemorate the Louisiana purchase. In 1933 Chicago opened a great world's fair to celebrate a centenary of progress. *See also BRITISH INDUSTRIES FAIR.*

The term E. is also used for an allowance or bounty to students in a univ.

Exhumation. Under the Eng. law it is a misdemeanour as well as sacrilege to disinter or interfere with a human body in any way without lawful authority for so doing, when the corpse is buried in consecrated ground. The eccles. courts have power to grant faculties for removing interred remains, but only that they may be re-interred in other consecrated grounds. In cases of suspected foul play, the coroner may order disinterment for medical inspection and E. may also be ordered by the Home Office, but otherwise no body may be disinterred without licence.

Exile, banishment from one's country by authority, either permanently or for a limited period. Outlawry and transportation involved exile. Magna Charta abolished outlawry of freemen otherwise than by the law of the land. Transportation of convicts was finally abolished in 1864. *See also BANISHMENT.*

Existentialism, post-war philosophy which became the vogue in France after the liberation (1944) especially among intellectuals of the Lat. Quarter. The chief apostle of E. is Jean-Paul Sartre (b. 1905) who gave the world his creed in a series of successful plays, books and essays. Briefly, E. may be defined as a

school of thought based on a conception of the absolute inanity of existence, absurdity of the universe, negation of all creation and, therefore of all morale or, as Sartre has put it, 'all human activities are equivalent, all are destined by principle to defeat.' One of the basic principles of E. is that man can shape his own destinies by the exercise of his will in the face of the given set of potentialities which is his life. The main premise and point of departure is the concrete fact that man *exists*. Predetermination is denied. Man has freedom of choice and of action; and each man's actions, while subjectively inspired, influence other people, so every individual is responsible to humanity as a whole. No dogmatic solutions of the eternal questions of ultimate origins or endings are offered. A man can choose his faith. An existentialist, says Sartre, can be Christian or atheist. Sartre is an atheist, though his disciples included even Catholics until the condemnation of E. by Rome, 1948. Sartre supports his philosophy with the theory of complete atheism and the blind following of one's instincts and primitive impulses, in contradiction to that of Man Alone on Earth with God as his Judge. E. refutes the sublime in man and chooses to portray only his misery. Hence Sartre's play *Morts sans Sepulture* which tells of the extreme mental and physical suffering of a group of French men in the resistance movement who have been captured by Fr. traitors and thugs employed by the Ger. police during the occupation. His *Huit Clos* is a quasi-philosophical drama of frustration staged in an existentialist conception of hell, which was produced in London as *Vicious Circle* and in N. York as *No Exit* with considerable success. Sustained criticism of E. has come both from Communists, who consider it incompatible with Marxist dialectical materialism, and from Catholics.

The familiar contrast between 'existence' and 'essence' suggests that the existentialist philosophy is not entirely novel; for, in the hist. of philosophy, it is implicit that we cannot derive the particular existent from its supposititious abstract properties or from those of which it is said to be an 'instance.' The existentialists of to-day are insistent that we must disregard the abstractions, generalisations, and inquiries into 'essential' qualities, and concentrate on existence in and for itself. To the existentialists, it is the particular experiences in which we make choices that are significant; for it is *choosing* rather than *thinking* that is explanatory of the existentialist attitude, because it is just those experiences which enable us to feel and exhibit our individual distinctiveness. These experiences are, therefore, revelatory of our true nature; they are moments when we truly *exist*, they are experiences of *Existence* (Kierkegaard). E. is, therefore, a philosophy which claims it is concerned with actual life as it is lived, and not with abstractions, and that it is especially concerned with the implications of those moments when life is lived in some revealing way, which is

somehow different from mere living. But the difficulty in this logical analysis comes when the existentialist selects as revealing, experiences such as are in no way universal and upon them founds repellent systems as if they were revelatory of the predicament of 'mankind' in general. This was essentially the attitude of Kierkegaard from whom, really, the existentialist movement borrows its distinctive features. Karl Jaspers, whose thought more resembles that of Kierkegaard, than does that of the other existentialists, discusses in his *Philosophie* (1938) the study of *Existenz* as a mode of philosophy, and in his work too we come again upon the contrast between mere existence and significant existing; but Jaspers introduces other persons and the interplay of mutual communication and stresses the experience of another person as a separate other person, whereas Martin Heidegger, whom Sartre follows, eschews an Other and argues, with consistent existentialist logic, that there is nothing there and that existence is somehow born from Nothing. See J. P. Sartre, *L'Être et le néant*, 1943, and *Existentialism and Humanism*, 1948; G. de Ruggiero, *Existentialism*, 1946; E. Mounier, *Introduction to Existentialist Philosophies*, 1949; N. Bobbo, *The Philosophy of Decadentism: A Study of Existentialism*, 1949; R. Friedmann, *Kierkegaard and other Existential Studies*, 1949.

Ex Libris, see BOOKPLATES.

Exmoor, dist. on the border of Somerset and Devon, England, near the Bristol Channel, mainly moorland and marsh, the hills rising to 1100-1700 ft. The chief heights are Dunkery Beacon and Exe Head. Sheep and ponies are largely raised, and the Exmoor breed is famous, while the red deer is still found, carefully preserved, and hunted. The R. Exe rises among the uplands. There are many prehistoric barrows. It is the scene of Blackmore's romance of *Lorna Doone*.

Exmouth, Sir Edward Pellew, first Viscount (1757-1833), Brit. admiral, entered the navy at the age of thirteen, and very early in his career proved himself capable and gallant. He rose rapidly in the service and in 1816 he won world-wide recognition by his bombardment of Algiers when the Bey refused to abolish Christian slavery. For this service he was made viscount. There is a biography by Edward Osler (1835).

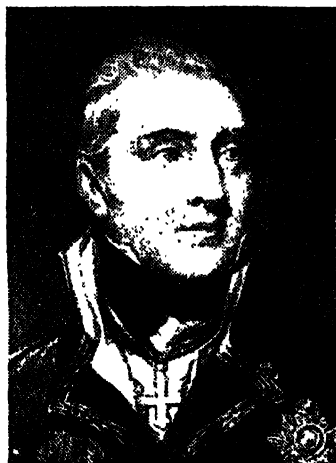
Exmouth, seaport of Devonshire, England, at mouth of R. Exe, on the Enk. Channel, 9 m. S.E. of Exeter. It is a noted watering-place, having beautiful surroundings and a sheltered climate. There are good docks, which are 530 ft. long and were opened in 1869. E. is worth visiting for its matchless sunsets. A fifteenth-century mill-wheel called Marpool Mill is still in motion. There is a wealth of pleasure grounds and shaded walks and a spacious esplanade 2 m. long. Pop. 15,000.

Exocarpus, native cherries of Australia, of the family Santalaceae. *E. latifolius* or broad-leaved cherry yields a tough hard close-grained wood weighing five stone a cubic foot. It is pale brown wood, re-

sembling satinwood. *E. cypressiformis* yields a reddish coloured hard straight-grained wood, also very heavy. The woods of E. are used for golf-clubs, marquetry, tool-handles and cabinet-work.

Exocetus, see FLYING-FISH.

Exodus, The Book of, the second book of the Pentateuch, was generally attributed by tradition to the authorship of Moses, to whom, indeed, the Jews attribute the authorship of all these five books. It continues the hist. of the family of Israel after the death of Joseph, though now it is less the record of a family than that of a nation. It tells of the birth and training of Moses, the departure from Egypt, and the events in the wilderness. It is a composite narrative, the various sources being



VISCOUNT EXMOUTH

much the same as those of Genesis. The book ends with the account of the construction of the tabernacle and its fittings, according to the divinely-ordained pattern, and with the entry of the glory of Yahweh into his dwelling-place. See J. Estlin Carpenter and G. Harford-Battersby, *Hexateuch* (1900); B. W. Bacon, *The Triple Tradition of the Exodus*, 1894; J. Jack, *The Date of the Exodus*, 1926; J. Harford, *Survey of Pentateuchal Criticism*, 1926; Raffalowitz, *The Pentateuch: our Inheritance*, 1932; D. Davidson, *The Exodus of Israel*, 1933.

Exogamy, term applied to tribal custom compelling marriage outside the tribe, clan, or 'totem,' thus the converse of endogamy (q.v.). E. holds good among the aborigines of Australia; the Somalis and Bakalaharis of E. Africa; the tribes of W. and Equatorial Africa; the Khasias, Iuangs, Warais, Cracons, and Hos of India; the Kalmucks, Circassians, Samoyeds, Ostiaks, and Yakuts, and the N. Amer. Indians.

Exogens, see DICOTYLEDONS.

Exon Domesday, see EXETER.

Exophthalmio Goitre, see GOITRE.

Exorcism (from a Gk. word meaning 'to conjure out'), the act of conjuring evil spirits to depart out of the person possessed, the term being specially applied to the freeing of an individual from a possessing spirit. There are numerous examples of the exercise of E. in the early church, Tertullian and Origen speaking of it as an ordinary occurrence. The professional exorcist was known among the Jews, and the art was practised by women in Greece. The anct. rite of E. in connection with baptism is still retained in the Rom. ritual, which contains also a form of special service for the E. of possessed persons. See G. Mylius, *De Abrogatione Exorcismi in Baptismo*, 1591; R. Woolley, *Exorcism and the Healing of the Sick*, 1932.

Exoteric, see ESOTERIC.

Exotic Plants are those introduced from a foreign country, as opposed to indigenous or native ones. Popularly speaking E. P. are those which have come from tropical or sub-tropical climates, and so have to be grown with heat under glass. For the harder ones a greenhouse is sufficient which keeps out frost and cold winds, but to which air is daily admitted: the more tender require much more heat, no direct outside air, and much moisture.

Expansion. An E. or increase of bulk due to the action of forces from within is a notable effect produced by heat on matter. It has been found by experiment that in general all bodies expand by heat or rise of temp. The length of a metallic bar varies with every change of temp., and is always the same at the same temp. This more increase of length is more correctly called 'elongation' or 'dilatation.' The tire of a cartwheel is thus fixed by enlarging the wheel hoop by heat. When cold it subsequently contracts, and clings closely to the wooden framework. In structures such as bridges and arches E. and contraction likely to ensue from changes of temp. must be taken into account. Watches and clocks are liable to go faster in cold weather, and slower in hot, as a result of the E. or contraction of their balance-wheels and pendulums. Exceptions to the ordinary rule of E. under heat are vulcanised rubber, oxide of copper, and the diamond at low temp., iodide of silver and iron beyond red-heat. Water begins to expand when lowered to 40° F.; otherwise most bodies begin to contract when the temp. is lowered. Among solids metals are the most expandable by heat. The observed E. of a liquid or gas within a containing vessel is called its 'apparent E.' the 'true E.' being found by correcting for the changed E. of the vessel. When homogeneous bodies are uniformly heated E. takes place equally in all directions, resulting in change of volume but not of form. In all bodies or systems that are not homogeneous, E. is not equal in all directions, and change of form results from the changes of temp. See also BAROMETER, HEAT, THERMOMETER.

Expansion, in mathematics, the detailed working out of a contracted expression contained in a short statement: the writing out in full of its meaning, or the result thus obtained. Thus the E. of $(a + b)^2$ is $a^2 + 2ab + b^2$. Among theorems for E. may be mentioned Taylor's and Fourier's. See I. Todhunter, *Algebra*, xxxvi., Fonnior series.

Expectation of Life is the technical term used to indicate the number of years which any one from any group of persons (males, females, sailors, plumbers, etc.) may live, the attendant circumstances being normal. In other words, it is the mean time which a number of persons at any moment of age will live after that moment. The same idea is expressed by the Fr. *vie moyenne*, average life—or by the Eng. expression *after life-time*, meaning the duration of life after any particular moment of life. Tables showing E. of L. have been compiled and issued at intervals from 1843, when A. W. Farr, the Deputy Registrar-General pub. Eng. Life Table No. 1. This was followed in 1853 by Eng. Life Table No. 2, and in 1861 by Eng. Life Table No. 3. These pub. are also known as Farr's Life Tables, and comprise a large number of tables of annuities and anniversary tables for the estimation of different kinds of life contingencies. Tables showing the E. of L. are used by Insurance Companies in fixing their premium terms for policies payable at death or at a stipulated age and also their terms for annuities.

Expectorant, drug which aids expectoration and facilitates the removal of secretions from the air passages. The simplest ways of aiding expectoration are: The local application of heat, by means of inhaling steam, medicated sprays containing ammonia, creosote, iodine, carbolic acid, eucalyptus, etc. The drugs taken internally are: Ipecacuanha, iodides, and chlorides of potassium, sodium, and ammonium. Es. are used for colds, bronchitis, and other affections of the air passages.

Expeditionary Force, British, see BRITISH EXPEDITIONARY FORCE.

Expenditure, National. The gross expenditure of Great Britain in recent years (each ending March 31) is:—

Year.	Expenditure. £
1904-5	151,769,000
1913-14	197,493,000
1914-15 (F. World War)	560,474,000
1915-16	1,559,158,000
1916-17	2,198,113,000
1917-18	2,696,221,000
1918-19	2,579,301,000
1919-20	1,665,773,000
1920-21	1,195,428,000
1921-22	1,079,187,000
1922-23	812,197,000
1923-24	788,840,000
1924-25	795,777,000
1925-26	826,100,000
1926-27	842,395,000
1927-28	838,585,000
1928-29	818,141,000
1929-30	748,712,000

Year.	Expenditure.
1930-31	799,170,946
1931-32 Two Budgets	770,599,000
1932-33	777,070,000
1933-34	693,419,000
1934-35	688,879,000
1935-36	749,979,000
1936-37	802,886,000
1937-38 Nat. Defence	847,024,000
1938-39	943,649,000
1939-40 S. World War	1,325,122,000
1940-41	3,884,288,000
1941-42	4,775,694,000
1942-43	5,637,367,000
1943-44	5,798,421,000
1944-45	6,062,004,000
1945-46 Two Budgets	5,565,231,000
1946-47	5,484,333,000
1947-48 Two Budgets	3,187,104,000
1948-49	2,975,673,000
1949-50 (Estimated)	3,308,368,000

Experience, really a philosophical term, but a very ambiguous word, and often used in an historical sense referring to the process in the past by means of which we have gained present knowledge. It is a continuous process, widening and extending the knowledge of an individual, and embraces both present and future. Pain, sorrow, pleasure, good and evil, and any change of sentiments and views all come under the heading of E. It is employed in a religious sense also; thus people talk of 'experiencing' religion, that is, becoming converted. The work of the mind, by means of which knowledge grows, is a work of discovery; and actual E., whether it be wide or narrow, is not mere data only, but concrete, definite knowledge. The widest conception of the term is when the whole race is substituted for the individual. Then we obtain a collective E., embracing life as a whole and the knowledge gained by living it. From this all-comprehensive meaning, all other meanings in which the term is used are more or less legitimate abstractions. Primary E. may be reduced to the barest minimum of sensation and feeling, that is to say, a distinction is drawn between what is directly perceived and what is only inferred, and E. can be explained as manufactured out of these immediate or primary data of sense. When regarded in this way, controversy arises between false empiricism and its counterpart, rationalism.

Experiment (from Lat. *experiri*, to try), literally the action of trying anything, putting it to the proof or test. It is a great method of scientific inquiry, as opposed to observation. An operation, in science, undertaken either to discover something unknown, or to test an hypothesis and illustrate truths already proved and known. It consists in the arrangement of the elements or essential features of some process, so as to allow observation at will. Laboratory Es. serve to distinguish purely accidental circumstances from the really essential conditions of any phenomenon. In meteorology, biology, and even astronomy, Es. play an important part. Newton's law of gravitation was founded on experiment.

Experimental Embryology is that branch of Embryology concerned with the conditions necessary for the development of ova into new individuals, the mode of development, the functions of the various cells formed by the div. of the ovum, and the relative importance of the nucleus and the cytoplasm, both in development and heredity.

Although fertilisation is generally essential for the formation of embryos, there are sev. animals and plants in which the unfertilised ovum develops (parthenogenesis). Fertilised ova of the honey-bee produce females (workers and queens); unfertilised ova develop into males (drones). Aphids produce two kinds of ova, one parthenogenetic (*see* EMBRYOLOGY) the other requiring fertilisation, and many other Invertebrata are frequently reproduced by parthenogenetic ova. Experimentally the unfertilised eggs of sea-urchins have been activated by chemical methods. Starfish eggs exposed for a time to a comparatively high temp. develop without fertilisation, and a frog's egg pricked with a needle, will develop parthenogenetically. Such experiments have led to the conclusion that the egg in itself contains all that is necessary for actual development, and sperms, or physical or chemical stimuli, merely enable the reactions to begin. An additional rôle of the sperm is to carry hereditary factors (*see* CELL and HEREDITY) and hence the inheritance of the embryo formed by a fertilised ovum is biparental.

The relative parts played by ova and spermatozoa in heredity have been investigated mainly by experimental hybridisation and by inducing sperms to enter enucleated eggs. The general results of such experiments, carried out mainly with various Echinodermata, show that some characters are transmitted through the nucleus, and therefore inherited from both parents. Characters distinctive of the group to which the animal belongs may be transmitted through the cytoplasm of the ovum, but experiments on the development of enucleated ova activated by the sperm are not yet conclusive, especially since such ova do not usually develop beyond the larval stage. The small amount of cytoplasm provided by the sperm is negligible as an agent in inheritance.

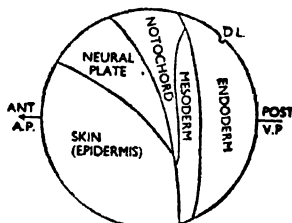
The cortex, i.e. the cytoplasm at the periphery of the egg, secretes a substance, 'fertilisin,' that enables spermatozoa of the same species to enter, while it inactivates those of other species. Removal of the cortex renders the egg incapable of fertilisation. Immediately the sperm enters, a membrane is formed, excluding other sperms, but in large yolk eggs the membrane forms slowly, and sev. sperms may enter; only one fuses with the nucleus of the ovum.

By centrifrifuging eggs it has been shown that some, e.g. *Ascaris*, are of the 'mosaic' type, having their materials arranged in a definite pattern which is destroyed by the experiment, and consequently the egg develops abnormally. Eggs of frogs and sea-urchins are not damaged by centrifrifuging, and in such eggs differentiation of the

cells may not take place until after the fifth div. of the ovum.

The stage at which cells become differentiated has been determined by interchanging cells from various parts of the embryo at different stages of development. Undifferentiated cells produce tissues normally formed in the region to which they are transplanted, but differentiated cells, even though the differentiation be invisible, will develop into the kind of tissue they would have produced before transplantation. Since some parts of the embryo induce in the area to which they are transplanted the development of structures which do not normally arise there, they are regarded as 'organisers.' These grafting experiments, and the discovery of organisers, is associated particularly with Spemann and his collaborators.

Prof. C. M. Child has shown the existence of definite metabolic axes generally approximately coincident with the axes of symmetry in the egg and the embryo. An axial gradient, i.e. a fall in metabolic rate, extends from the anterior to the posterior pole, and from this primary gradient secondary gradients extend laterally, particularly in limb-forming regions. The existence of metabolic gradients has an important bearing on development.



Blastula of the amphibian from the side, showing the presumptive areas (after Vogt).

Ant., A.P., the animal pole and future anterior end of the embryo; Post., V.P., the vegetative pole and future posterior end; D.L., dorsal lip of blastopore.

The action of external environment upon the growth of embryonic cells is studied by growing them in culture media. Tissue culture also serves to determine the degree of self-differentiation reached by the cells. Cantl and Fell, for instance, have shown that the rudiment of a fowl's leg is capable of development into the various bones, joints and other parts even when completely isolated in a nutrient solution.

Experimental E. shows that stages of development are conditioned each by the preceding one. The functions are not irrevocably fixed from the initiation of the cells, but are determined mainly by the relations between the cells themselves and by other environmental factors.

Recently a new technique of *intra-vital staining* has been developed by Prof. Vogt of Zurich, and has cleared up pre-

vious obscurities in the process of gastrulation in the heavily yolked egg of Amphibia. Patches of cells on the outside of the segmenting egg (blastula) are coloured by harmless dyes, so that it is possible to observe the subsequent fates of these regions. Thus the egg has been mapped out into *presumptive areas* of ectoderm (sub-divided into skin and neural plate), notochord, mesoderm and endoderm. The presumptive skin remains on the outside; the remaining areas flow to the blastopore where, in process of being tucked inside the embryo, they come under the influence of the primary organiser, and their fates are then no longer presumptive but are finally sealed. Once the main parts of the embryo have been blocked out, secondary organisers come into play, imparting the detailed structure to the individual organs; the best-known example is the production by the optic cup (rudimentary eye) of a substance which stimulates the overlying ectoderm to sink down and become the lens. See C. H. Waddington, *How Animals Develop*, 1935; G. R. de Beer, *Introduction to Experimental Embryology*, 1926 (2nd ed. 1934).

Experimental Psychology is virtually a new science, since much that was studied as such up to a few years ago is now regarded as physiology. It has not been found possible to submit all the questions of psychology to the test of laboratory experiment, but the method may nevertheless be applied to a considerable number. Experimental studies of the processes of remembering and forgetting have been carried out, whilst hearing, seeing, feeling, tasting, and smelling have been investigated experimentally.

In the last few years attention has been concentrated upon experimental studies of abilities of various kinds. Typically, these studies have proceeded from the devising of tests of various kinds, which have then been applied to large groups of individuals. The wide applications of the tests, and the study of the individuals tested, have enabled the experimenter to know something of the implications of the various scores given for success with the tests. He may then apply them to new individuals, and, from the scores they make in connection with the tests, predict with some confidence the extent to which the individual will show the ability which the test is designed to discover. The application of statistical methods to the interpretation and standardisation of the tests has resulted on the one hand in the formulation of the tests of proven reliability; and, on the other, in the development of new views regarding ability.

The formulation of tests has had important results in the educational field, since the 'intelligence tests' of Binet, Terman and Burt appear to be tests of educability. In the industrial field, certain tests have been devised which show whether the person tested possesses the necessary ability to follow callings which demand proficiency in certain operations. In industry, not only have tasks been analysed and shown to consist of combina-

tions of simple operations, but the ability for performing such operations has been experimentally investigated, and the conditions under which such operations may be best carried out by persons with the ability to perform them have also been studied. As a result the industrial psychologist is finding himself increasingly in possession of reliable information which enables him to advise employers as to whom to engage or reject, and further to inform them as to the conditions in which their output may be raised to an optimum and their work maintained at a constant standard of maximum efficiency. Interesting studies have been made of the effect of temp., ventilation, noise, lighting and other factors on the general behaviour and output of workers, and others are still being made. Not least is the introduction of bright colours into the decoration of industrial premises, and to the machines in them; in particular to the colouring distinctively of handles and emergency points, which reduces the strain on the worker in repetitive operations. The increasing importance of this dept. of psychology led to the foundation by Sir Charles S. Myers, M.D., Sc.D., F.R.S., of the National Institute of Industrial Psychology. See C. Spearman, *The Nature of Intelligence*, 1923, and *The Abilities of Man*, 1927; Mary Collins and J. Drever, *Experimental Psychology*, 1926; C. Murchison (ed.), *The Foundations of Experimental Psychology*, 1929; S. Freud, *Civilisation and Its Discontents*, 1930; W. McDougall, *Psycho-analysis and Social Psychology*, 1936.

Expert Witness, see *under EVIDENCE*.

Exploration, see *GEOGRAPHY*.

Explosion, the sudden and forcible expansion of certain substances through the action of heat or other cause. This expansion may either take the form of the conversion of solids or liquids into gases, or the increase in bulk of gases themselves through chemical changes.

Explosives, compounds or mixtures of an unstable character which can readily undergo chemical changes of an explosive nature.

According to the official Brit. list of authorised explosives, the classes recognised are: gunpowder, nitrate mixture, nitro-compound, chlorate mixture, fulminate, ammunition, firework.

Gunpowder is an intimate mixture of potassium nitrate, charcoal and sulphur in the proportions 75 : 15 : 10, mainly used for blasting. **Gun-cotton**, or trinitrocellulose, is a typical high E. discovered by Schönbein (1845), by the action of a mixture of nitric and sulphuric acids on cotton. Other forms of cellulose besides cotton, when nitrated, give nitro-celluloses. **Nitroglycerin**, discovered by Sobrero (1846), made by the action of nitric and sulphuric acids on glycerin. **Kieselguhr**, a siliceous earth, absorbs it (see *DYNAMITE*). Chemically it is glycerin trinitrate. **Cordite** is made by making a paste of nitroglycerin, gun-cotton, and vaseline (30 : 65 : 5) with acetone, and after forcing through dies, allowing the excess of acetone to evaporate. The re-

sult is a horny brown substance. **Cordite** is used largely for sporting rifles. **Blasting gelatin** is a mixture of nitrocellulose and nitroglycerin. **Picric acid** (trinitrophenol), is used largely for high explosive shells. **Trinitrotoluene** is safer to handle than picric acid. It is a high E. and gives rise to clouds of undecomposed carbon. **Amatol** is composed of trinitrotoluene (20) and ammonium nitrate (80). **Ammonal** is like amatol, but with powdered aluminium. **Cheddite** contains potassium chlorate, castor oil, and a nitro-body. **Sprengel** mixtures contain an oxidising agent such as nitric acid or potassium chlorate, together with a combustible substance like nitrobenzene, petroleum, etc. **Schultz** smokeless powders are made from nitrated wood and potassium and barium nitrates. **Oxyliquit** is liquid oxygen in a suitable absorbent such as kieselguhr. **Fulminates** of silver, mercury, etc., suitable for use in percussion caps. See also *BLASTING, BULLET, CARTRIDGE, DYNAMITE, FIREARMS, and INFERNAL MACHINES*.

Explosives Committee, body under the organisation of the War Office for the purpose of advising on subjects connected with explosives.

Exponent, or Index. In algebra, the E. or index is a symbol placed just above and to the right of another (termed the base) in order to indicate the power to which that base is to be raised. Indices may be positive, negative, or fractional. Thus a positive index a^1 indicates $a \times a$, i.e. a raised to the second power; a negative index a^{-1} indicates $\frac{1}{a^1}$, or the reciprocal of

a to the second power; while a fractional index $a^{\frac{1}{2}}$ indicates \sqrt{a} , or the square root of a . More generally $a^m \times a^n = a^{m+n}$. This is one of the fundamental laws of algebra, and is the principle behind the logarithm (*q.v.*) which transform the practical process of multiplication into addition. A logarithm is merely an E. Similarly $a^m - a^n = a^m - a^n$, $(a^m)^n = a^{mn}$ and $a^0 = 1$.

The **Exponential Series** depends on the transcendental number e which is derived from the consideration that if $y = \log_e x$, and $\frac{dy}{dx} = \frac{1}{x}$, then the number $e = 1 + \frac{1}{1} + \frac{1}{2!} + \frac{1}{3!} + \dots = 2.718 \dots$, and is the natural logarithmic base for theoretical purposes.

Exports, see *IMPORTS AND EXPORTS*.

Express. The word E. in the Brit. Post Office signifies immediate delivery of letters or packets by a special messenger at a higher prepaid rate, on the system introduced in 1891. **Express train** was the name given in 1845 to one running 'expressly' to take passengers to one particular place and not stopping elsewhere (what would now rather be a 'special'). To-day it means a train travelling at a high speed stopping only at a few important intermediate stations. In the United States the express system is an institution for the rapid and safe delivery of light goods and parcels, the idea having first originated in 1839 with W. F. Harnden.

The present Adams Express Co. was formed (1849) as 'Adams and Co.'s California Express,' and the Wells Fargo Co. started 1852. The American-European Co. was the first trans-Atlantic E., founded in 1855. A feature of the Amer. system is the 'Collect on Delivery' business, goods being marked C.O.D. The companies aim at saving their clients all trouble, taking entire responsibility from the time of collection to that of delivery. The parcel post (1883), Post Office, and railways undertake most of such duties in the United Kingdom. See F. J. Stimson, *History of the Express Business*, 1883.

Expressionism, form of art which endeavour to express the inner life of the artist, in which process the objective content is but a means to that end, wherein the subjectivity of the artist engrosses the interest so much that the external object may not dispute its supremacy, and either disappears or becomes unrecognisable. In brief, subjective presentation accompanied by total or almost total distortion of nature to the point of unrecognisability, or by suppression of all external reality. According to Max Raphael 'Art should merely reproduce the artist.' For a proper appreciation, or perhaps interpretation, of a picture, the critic will require to translate the detail of the picture as symbolic of some experience, whether physical, intellectual or spiritual, of the artist, much as psycho-analysts interpret the recollected incidents of dreams. The movement towards E. arose in the first quarter of the twentieth century as a reaction against Impressionism (*q.v.*) chiefly in Germany, Russia, and the Scandinavian countries. Among prominent expressionist painters are Severini, Nolde, Boccioni, Schaefer, Casper, Munch, Chagall, Compendonok, and Max Raphael; among sculptors, the Russian Archipenko. Variations of E. are Cubism, Futurism, Constructivism, and Surrealism.

The term E. properly belongs to painting, but can be loosely applied in music to composers who aim at the interpretation of moods and states of mind, not by the accepted symbols of romanticism, but by apparently unrelated abstractions, and in literature to writers like Kafka and James Joyce and many modern poets who express their inner truth in the raw symbols that spring from the unconscious. See C. Marriott, *Modern Movements in Painting*, 1921; A. Pope, *The Painter's Mode of Expression*, 1929-31; R. Samuel and R. H. Thomas, *Expressionism in German Life, Literature, and Theatre*, 1910-21, 1939.

Extension, in logic, a term used of any given term to describe the total number of objects to which it may be applied, being practically synonymous with 'Denotation,' and opposed to 'Intension' or 'Connotation,' which are used of the attributes essential to the conception of the term.

Extortion, in Eng. law, the term applied to the improper, premature, or excessive exaction of money or money's worth by public officers; also to such exaction by means of threats of personal violence or

blackmail. E. is regarded as a misdemeanour by the common law. See **THREATS**.

Extracts are solutions or syrups containing one or more substances that have been removed from admixture with others by means of a solvent. The methods of extraction depend on the particular case, but as a rule, the solvent, which may be water, alcohol, ether, acetic acid, etc., is poured over the crushed or powdered substance, and, after standing, is strained off. The substance is said to be macerated if the solvent is cold and digested if warm. When the substance is boiled with the solvent, a decoction results. Many forms of apparatus for performing extractions have been devised, with a view to minimising the amount of solvent used, and thus rendering the subsequent concentration of the E. a less tedious process.

Extradition (Lat. *ex*, out, and *traditio*, handing over), the giving up of a person accused of crime to the gov. in whose ter. the offence was committed by the gov. In whose ter. he has taken refuge. Great Britain has entered into E. treaties with practically all civilised nations; the offences for which E. is permissible are naturally all of a serious nature, including arson, murder, piracy, embezzlement, etc. In most states offences of a political nature do not allow of E.; such offences are not those with a political motive, but those which 'are incidental to and form part of political disturbances.' Criminals are not given up unless some specific treaty is in existence with the gov. requiring them, and in Eng. law the gov. has no power to surrender a fugitive criminal without express statutory authority. It is necessary to show the offence enumerated and the specific treaty, and also that the acts with which the fugitive is charged amount to the alleged offence according to the laws of both the govts. concerned. The authority in Great Britain is contained in the Extradition Acts of 1870-73. The fugitive can be tried only on the specific charge for which he was given up. Whether a state is called upon to give up its own subjects varies with different nations; the procedure in relation to Great Britain and other nations is briefly as follows. With France and Germany neither gov. surrenders its own subjects; with Spain and Switzerland Great Britain only surrenders them; with Russia, Belgium, and the Netherlands it is optional. If a Sp. subject committed a crime in Switzerland and took refuge in England, the Brit. Gov. would surrender him to Switzerland only after the consent of Spain had been obtained. A fugitive is committed on the same evidence as for an ordinary crime, but is not surrendered until a diplomatic representation of the gov. demanding him has been addressed to the secretary of state. In the U.S.A. foreign E. is not regulated by the individual states but by the Federal Gov. When a demand is made for E., the accused is handed over if his probable guilt is estab. at a preliminary examination before a commissioner or judge. An E. treaty embraces all previous crimes committed by the same person. Inter-

state E. is provided for by Act of Congress under the Constitution. The fact that an act may be no crime in one state does not debar another where such act is a crime from demanding surrender. Release by writ of *Habeas Corpus* is the procedure on an improper surrender. See also FUGITIVE OFFENDERS ACT, 1881.

Extra-Territoriality, or Exterritoriality, term of international law, which denotes the exclusion of certain individuals from the rule that everybody within the boundaries of a state is subject to the laws of that state. It is also used to describe the quasi-exterritoriality of the dwelling-place of an accredited diplomatic agent, and of public ships of one state when cruising in other waters than their own. Generally speaking, all cases where a state refrains from enforcing its laws within its own ter. are cases of the operation of the principle of extra-territoriality. The persons who come under this rule are those of foreign sovereigns, whether travelling under an incognito or not, ambass., ministers, plenipotentiary and other accredited diplomatic agents. Not only are the persons of these included, but their suites also, and their belongings. Public ships in foreign waters also enjoy the rights of exterritoriality. Consuls are not as a rule included, are in some non-Christian countries. In certain non-Christian states also extra-territoriality has been granted by treaty to the subjects of contracting Christian states who are resident therein (see CAPITULATIONS). Eng. settlements in the Far E. were subject to the conditions of the treaties by which they came into being. In the period 1928-37 the Nationalist Gov. of China had two main lines of policy: to achieve uniformity of political structure and administrative control within China, and to strengthen and modernise the country. The gov. showed a high average of skill in dealing with foreign interests. Here the primary problem was the old yearning of the foreign interests for a 'strong man' to run China on their behalf. These interests were then still conservative in their attitude and disposed to resent any attempt of the Chinese Gov. to make foreign enterprise respect the national interests of China. They obstinately clung to the theory that the foreign concessions and the system of E. were essential safeguards of 'law and order'—although disorder and corrupt politics were still fostered by the ability of all Chinese war lords and others who got rich in unpatriotic ways to put their money in foreign banks in the foreign concessions, safe from taxation or any form of Chinese control. These foreign interests would have liked nothing better than to make Chiang Kai-shek their strong man. But Chiang Kai-shek built up the strength of the gov. and its international credit without allowing foreign control to increase either politically or financially. Gradually he succeeded in committing America and Britain, among the great powers, not only to the support of the Chinese Gov. but to progressive relinquishment of their privileges and res-

toration of the sovereignty of China, so that Japan stood more and more isolated both as the advocate of territorial and political imperialism in China and as a rival threatening Amer. and Brit. interests. As early as 1931 the Chinese National Gov. announced the abolition, as from 1932, of extra-territorial rights of foreigners resident in China. This announcement followed China's refusal to accept the Powers' demands that foreign jurisdiction should continue at Shanghai, Canton, Tientsin, Peking, and Hankow. It was further announced that courts for the trial of criminal and civil cases involving foreigners were to be estab. in special areas, including Shanghai, Tientsin, Mukden, and Canton; but these decisions could not then be implemented owing to the capture of all these cities by the Jap. invaders. In 1942, however, the Brit. and U.S. Govs. relinquished extra-territorial rights in China. Gen. Chiang Kai-shek in Oct. of that year sending messages of appreciation to Mr. Churchill and Mr. Roosevelt for their gesture of friendship and goodwill manifested in their determination to abrogate E. in China and thereby to allow China to assume the full stature of an independent democratic nation. There were formerly similar agreements or capitulations with Turkey for securing immunity to foreigners in that country or in its dependencies, including Egypt. In the case of Egypt, the question of capitulations was settled by the Anglo-Egyptian Treaty of 1936 (see EGYPT). An exceptional case of exterritoriality was that granted to the residence of the pope by an It. law. When armies are allowed by another gov. to cross the borders of their own state, they thereby come into possession of exterritorial rights. It was laid down in the arbitration of the *Alabama* case that the extension of exterritoriality to ships was not the law of nations or an absolute right, but simply an act of courtesy; such a view is not in accord with the universal practice. The extension of immunity to vessels owned by states and engaged in trade was an issue before the Eng. courts in *The Porto Alexandre* (1920), in which case the Court of Appeal in spite of the commercial difficulties that might arise, felt bound in view of the prevailing fashion of internationalisation to follow the decision in *The Parlement Belge* (1878) where the fact that a ship had been declared by a foreign sovereign to be in his possession as sovereign was held to be conclusive and to confer immunity from the local jurisdiction.

Extravasation, passage of fluid from a vessel. The term is also applied to the passage of fluid into an unusual position by bursting or perforation. E. of blood is the most commonly seen, as in a bruise, the size of which depends upon the amount of blood that leaves the damaged vessels, and the chances that a bruise goes through are caused by the alteration in the blood. The extravasated blood is either absorbed or remains fluid, and has to be removed, or else gangrene of the skin or damage of deeper parts results. The

treatment of a bruise consists in applying cold to check the bleeding, and when the bleeding has been arrested and there is no longer an increase of swelling, heat is applied to dilate the neighbouring vessels and enable them to drain off the extravasated blood.

Extreme and Mean Ratio, in geometry, a phrase used of the proportional div. of straight lines. Thus if AB is a straight line, and the point of div. is at C, the line will be divided in extreme and mean ratio, or medial section, if the ratio $AB : AC = AC : CB$. The term is used by Euclid, who states the problem in Book II. prop. 2.

Extreme Unction, sacrament of the Rom. Catholic Church, reserved to those at the point of death. It is believed to give spiritual aid to the person receiving it and also, when God so wills, to restore bodily health. The custom of anointing the sick with oil doubtless had its origin in the counsel of St. James (James v. 14), but it is noteworthy that this passage makes the cure of the sick person the object of the act. There are still traces of this primitive view in the Rom. rite of unction. In the Gk. Church the ceremony is known as 'The Holy Oil,' or 'The Oil of Prayer,' and the primitive view has remained more fully. In the 1549 Book of Common Prayer, a form of unction was given, but this has since been omitted. The practice of unction of the sick with the primitive intention has lately been revived in the Eng. Church with episcopal consent.

Exuma, Great and Little, two of the Bahama Is. These two, together with the smaller Exuma Keys, are about 150 sq. m. in area, and support a pop. of 2300. The chief tn. is Georgetown.

Eyalet (Arabic *wāli*, a governor; *wilāyat*, a prov.), originally the term applied to a pashalic, or one of the largest administrative divs. of the Turkish empire; now to a prov. under the administration of a governor-general. 'Vilayet' is an analogous term.

Eyam, vil. of W. Derbyshire, England, 10½ m. N.E. of Buxton. It stands in a romantic vale in a dist. noted for its beauty, geological interest, and anct. Brit. and Saxon remains. Barytes mining is carried on. In E. churchyard is a fine ninth or tenth century Runic cross, restored by John Howard in 1738. The vil. was ravaged by plague in 1665-66. Pop. 1200.

Eyasses, see under FALCONRY.

Eyck, Hubert Van (c. 1370-1426), early Flemish painter, probably b. at Maaseyk on the R. Maas, who lived at Bruges and later at Ghent. He usually worked in conjunction with his brother Jan, being appointed together with him by Philip of Charolais as court painter at The Hague in 1422. They are said to have invented painting in oils, and certainly perfected the art of colour mixing, their work being famous for transparency and brilliance of colouring. To Hubert is attributed the major part of 'The Adoration of the Lamb,' of which four panels, up to the First World War, still in the church of St. Bavo at Ghent, and the other six in

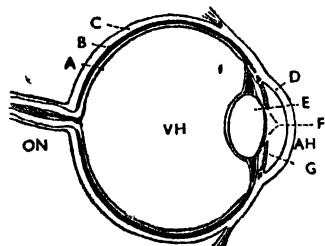
the Berlin Museum, were, under the Treaty of Versailles, returned from Berlin. Two lesser works by van E. are at Madrid and Naples. He had great intellectual power, and represented scriptural scenes and characters through the medium of such life as he himself had observed.

Eyck, Jan Van (c. 1390-1410), an early Flemish painter, brother and pupil of Hubert (*q.v.*), and like him b. at Maaseyk. During Hubert's lifetime he worked with him, and after his death completed 'The Adoration of the Lamb.' He also became court painter to the duke of Burgundy in Lille. He died at Bruges. His work, while lacking the power of conception of Hubert's, shows more attention to detail and delicate finish. His works, mainly portraits, historical subjects, and landscapes, include: 'The Consecration of Thomas à Becket'; 'St. Francis receiving the Stigmata'; 'The Virgin and Child'; the 'Madonna di Lucca,' the 'Portrait of Himself and Wife' (in the National Gallery, London); 'Portrait of Jan de Leeuw'; 'Head of Christ as Salvador Mundl.'

Eyck, Margaret Van, a painter, sister of Hubert and Jan. She lived a retired life as a member of the order of Our Lady of Ghent, and died before 1431, being buried in the cathedral of Ghent. She is believed to have executed some miniatures in the missal of the duke of Bedford.

Eye. The E. is one of the higher sense organs, and like those of hearing and smell, it consists of an essential part and an accessory part. The organ of vision, strictly speaking, consists only of the eyeball, but it is also necessary to discuss its many important appendages. The eyelids, fringed by the eyelashes (*cilia*) consist of integument with a thin layer of dense fibrous tissue strengthening their margins. They are closed by the *orbicularis muscles*, and the upper is raised by the *levator*. The *meibomian glands*, which secrete sebum, open on the free margin of the eyelids. A layer of mucous membrane (*conjunctiva*) lines their inner surface and is continued over the front of the eyeball. The upper lid is the larger and more movable, and joins the lower at the inner and outer canthi. Near the inner *canthus*, on each lid, will be seen the slight elevation (*papilla lachrymalis*) pierced by the *lachrymal canal*, which is the drainage channel for the fluid from the conjunctiva; this fluid is continuously secreted by the *lachrymal gland*, which is lodged in the orbit on the outer side of the ball. The reflex action of winking the lids about once in every two minutes distributes the fluid over the ball and thereby washes it. The lachrymal canals from above and below converge and open into the *lachrymal sac*, the upper slightly dilated end of a duct about ½ in. in length descending to the fore-part of the lower meatus of the nose. Stimulus of the lachrymal gland by pungent vapours or the stress of strong emotions may result in an excessive secretion of the fluid exceeding the capacity of the *lachrymal duct* and tears result. The conjunctival mucous mem-

brane becomes continuous with the nasal mucous membrane by means of this system of canals. The globe of the E. is not perfectly spherical, its antero-posterior diameter being about $\frac{1}{2}$ of an in., as also is its vertical, but the transverse diameter is usually a little longer, about 1 in. The eyeball consists of three concentric coats and of certain fluid and solid parts enclosed by them, viz. (a) the tough, firm, fibrous external coat, the *sclerotic* and *cornea*; (b) a middle vascular pigmented and in part muscular membrane, the *choroid* and *iris*; (c) an internal nervous and epithelial layer, the *retina*. The corneo-sclerotic case is kept in shape by (i.) the *aqueous humour* which distends



DIAGRAMMATIC SECTION OF THE EYE

ON, optic nerve; A, retina; B, choroid; C, sclerotic; D, cornea; E, crystalline lens; F, pupil; G, Iris; VH, vitreous humour; AH, aqueous humour.

the cornea; (ii.) the *vitreous humour* which fills the less convex sclerotic chamber; these two humours are separated by the *crystalline lens*. The whole may be represented as a 'water-camera' of the highest degree of perfection and adaptability.

A brief description of each of the above parts follows. The sclerotic coat is a strong, opaque, fibrous structure extending over about five-sixths of the eyeball. Its outer surface is pearly white; its inner is of a light brown colour. The remaining sixth, although not changed essentially in character, is transparent, and is termed the *cornea*. The cornea is normally from $\frac{1}{2}$ to $\frac{3}{4}$ in. in thickness. The choroid coat is a thin membrane, and supports in its outer layers the larger arteries and veins of the E. Its inner stratum is covered by hexagonal pigmented cells; these, which were formally considered as part of the choroid, belong in reality to the retina. Near the corneo-sclerotic junction the choroid becomes raised up into a number of longitudinal ridges or puckers (*ciliary processes*) arranged meridionally and forming a circle. The *iris* at its circumferential border is continuous with the choroid. It is a curtain with a round hole (pupil), and is provided with circular and radiating unstriped muscular fibres which adjust the size of the pupil. (Though unstriped, these fibres contract with extreme rapidity.) The pigment cells of the iris vary in different individuals, and the

different colours of Es. are partly dependent on the amount and distribution of the contained pigment. The retina is the delicate membrane containing the expanded termination of the *optic nerve*. It varies in thickness from $\frac{1}{16}$ to $\frac{1}{8}$ of an in., and forms the lining between the choroid and the vitreous humour extending nearly to the outer edge of the ciliary processes; its indented border is termed the *ora serrata*. It, for the most part, is of even texture and smooth surface, but almost exactly opposite the middle of the posterior wall is a slight circular depression (*yellow spot*), and not far from this, towards the nasal side of the eyeball, is a radiating appearance produced by the spreading of the optic nerve at its point of entrance.

It is impossible within the limits of this account to deal with the microscopic structure of this wonderful membrane. No less than eight distinct strata build it up, of which only four are here mentioned. The innermost layer is one of nerve fibres, and lying next to this is the layer of nerve cells; the outermost layer consists of the pigment cells previously mentioned, and immediately within is the layer of *rods* and *cones*, the former far exceeding the latter, except in the yellow spot. These bodies are closely packed, and it is suggested that each rod or cone conveys but one impression, so that any image, even microscopic in size, must be the result of combined impressions from a number of rods and cones. The *aqueous humour* is a watery solution of saline and organic material, while the *vitreous humour* is of a soft gelatinous consistency, and serves as a support for the delicate retina from which, in most parts, it may be readily separated. The crystalline lens, about $\frac{1}{2}$ in. across and $\frac{1}{4}$ in. thick, is a transparent solid body, double convex in shape and enclosed by an elastic capsule with attached suspensory ligaments subject to varying tensions. Its posterior convexity is the greater. It is composed of a number of concentric laminae, resembling the coats of an onion, and each lamina is composed of ribbon-shaped fibres built together in a peculiarly curved manner. The lens, which is practically spherical in the fetus, becomes more and more flattened with advancing age.

The action of the E. is roughly as follows: Diverging beams of light from any one point in an object strike all over the surface of the cornea, this gathers them slightly together, refraction follows in the aqueous humour, and the lens brings them to a focus, in normal vision, on the retina. The rods and cones are affected by the image, and in consequence cause disturbances and stimuli in the nerve fibres and an impulse is transmitted via the optic nerve to the brain. There are special adjustments for the varying distances of objects. This *accommodation* is brought about by (1) a compression of the ball of the E. by its muscles which cause a change in the form of the cornea; (2) a shifting of the lens bodily; (3) a pressure of the iris upon the front of the lens. The muscles which move the eyeballs are six in

number, four *recti* and two *obliqui*; and by means of the contractions of these sev. muscles the eyeballs may be moved in any desired direction.

Double vision, or *diplopia*, is the name given to an optical abnormality in which two images of the same object are seen. If the diplopia concerns one eye only it may be the result of some abnormality of refraction in the eye concerned, but if it disappears when either eye is closed, thus showing that both eyes are concerned in its production, it is true diplopia, and may be due to a transient weakness of the ocular muscles which will pass off. It may be the first warning of the disorder called disseminated sclerosis, or of the rare condition known as myasthenia gravis. A case of diplopia should therefore receive expert attention. The so-called double vision found after alcoholic excesses, in attacks of migraine, after the taking of drugs, etc., is really only blurred and muddled vision. *Nystagmus*, a condition in which the eyes are continually moving in a rhythmical fashion, from side to side, or up and down, or with a circular motion, is present in disease of the labyrinth or semi-circular canals which control the balance of the body. Sometimes it is due to disease of the eyes or of the parts of the nervous system which are connected with them. The *Argyll Robertson pupil*, called after the Edinburgh physician who first described it, is the name given to the condition in which the pupils do not react to light.

Wounds and foreign bodies.—As was said in the description of the structure of the eye, any irritation to the eye causes such intense pain to the individual that he usually seeks to remove the cause at once. This is one of Nature's ways of safeguarding sight, which is among man's most precious possessions. Every injury to the eye should receive immediate attention. Careful treatment of injury or inflammation in the early stages may avoid loss of sight in the damaged eye, and it must never be forgotten that undue strain thrown on the other eye may lead to blindness in it as well. The most frequent accident to the eye is undoubtedly the entrance of a foreign body; and the smallest particle of dust, splintered wood or metal, or coal, or road grit may be sufficient to cause grave damage. When a particle falls on it, the eye will water and thus the article may be washed to the corner of the eye, where it can be removed. Never rub the eye which has grit in it, but blow the nose and the particle may be dislodged so that it can be removed with the corner of a clean rag or handkerchief. If the foreign body be wedged under the upper lid, a few drops of a bland oil, such as castor oil, may be dropped into the eye in the hope that the particle will float out. If this is unsuccessful, gently grasp the rim of the lid and pull it out and downwards, pushing up the lower lid under it. Drop the upper lid, and as the lids slide apart again, the particle is very often carried out on the lashes of the lower lid. If these first-aid measures are unsuccessful, no further attempt should be made,

but the patient should be taken at once to the doctor. In the case of larger particles which are apt to enter the eyes of workers in such places as steel works, expert advice should be obtained at once. The cornea is subject to ulceration of various kinds. Even such a small wound as a tiny scratch may lead to inflammation and ulceration. Children from poor and dirty homes often develop these ulcers, sometimes in conjunction with tuberculous glands in the neck. Older people in poor health are prone to corneal ulcerations. When inflammation is present in the cornea without actual ulceration, the condition is called keratitis. All corneal inflammations require expert advice and treatment.

Wounds of the Eye.—Any sort of wound may happen to the eye, and accidents in which rods of metal or wood, such as prongs of pitch-forks, tools of all sorts, projecting parts of cars or furniture, stones, golf-balls, elbows and fingers at football, etc., enter the eye and lacerate it are fairly frequent. First-aid treatment only should be attempted, and the patient should as soon as possible be taken to the doctor, or the doctor be sent for if there is collapse from the shock and pain, which is often severe. The eye may be covered with a pad of wet boracic lint, and bound up with a bandage. Hot tea or coffee or other stimulant may be given to restore the patient. The worst aspect of an eye accident is the frequency with which the other, sound, eye becomes involved, and loses its sight, even though the damaged eye may recover.

Black eyes, in which the tissues round the eye become suffused with blood and discoloured, are common. The usual cause is a bruise in the region of the eye caused by a blow or knock, but sometimes black eyes occur after such happenings as operations on the nose. In a few days the blood which has collected in the tissues will be absorbed, and the dark colour will fade through shades of yellow to a normal colour again. Immediately after a blow has been struck on the eye, cold wet cloths should be applied, or the part should be covered with pads of cotton wool soaked in weak lead lotion. This treatment, if applied soon enough, may prevent a black eye from forming, and is cheaper and more efficacious than the slab of raw beef-steak of popular tradition. If a black eye develops in spite of these precautions, hot compresses may be used to relieve any pain, and grease-paint during the day will conceal some of the disfigurement without doing any harm.

Other conditions and diseases of the eye and eyelids are described under: **ASTHENOPIC**; **ASTIGMATISM**; **CATARACT**; **CONJUNCTIVA AND CONJUNCTIVITIS**; **EYE-LIDS**; **SORE**; **GLAUCOMA**; **MYOPIA**; **OPHTHALMIA**; **PINK EYE**; **SQUINTING**; **STYE**; **TRACHOMA**. See also **BLIND**; **COLOUR-BLINDNESS**; **OPTICS**; **SPECTACLES**; **VISION**, **DEFECTS OF**.

Eye, *tn.* of Suffolk, England, on a trib. of the R. Waveney, 20 m. N. of Ipswich. Formerly a centre of the pillow-lace industry. Pop. 2000.

Eyebright, see EUPHRASIA.

Eyemouth, tn. of Berwickshire, Scotland, at the mouth of the R. Eye, 8 m. N.W. of Berwick. It has large fishing industry. Pop. 2400.

Eyes, **Propagation** by, in plant culture, consists in carefully cutting out the eye, as it is called, and planting it afresh; this soon shoots out and becomes a new plant. The best known example of this form of propagation is the potato.

Eyelids, **Sore**, or **Blepharitis**. Sore eyelids are very common. They occur in persons, of any age, who are run down, but are most common in delicate children. Catarrhal conditions of the nose, eye, or ear, chronic skin diseases, anæmia, rickets, malnutrition, and infective and debilitated states of health generally may cause the eyelids to become sore and inflamed. Uncorrected errors of sight, and exposure to dust, glaring lights, etc., are also frequent causes. The condition is apt to become very chronic, and treatment may have to be carried out for months before a cure is achieved. Even then a return of the original debility may cause the lids to redden again. Any cause of ill-health must be attended to, and the general tone of the body raised as much as possible, by good food, rest, fresh air, and correct hygiene. Tonics such as those containing iron, arsenic, and strychnine are very useful, and a course of cod-liver oil often helps. The local treatment is to bathe the eyes sev. times a day in a warm mild antiseptic, such as a weak solution of boric acid or bicarbonate of soda. At night, yellow oxide of mercury ointment may be rubbed into the edges of the lids, and in severe cases the doctor may paint the eyelids with a silver preparation, such as argyrol or protargol. Chronic inflammation of the eyelids can be very disfiguring, and may lead to damaging of the eyelids and falling out of the eyelashes. At one time the lashes used to be removed, but this blemishing operation is fortunately no longer carried out.

Twitching or **fluttering** of the eyelids (**blepharospasm**) is another common accompaniment of weak eyesight, especially if supplemented by physical or mental debility. The treatment aims at toning up the general condition, and correcting any errors of sight. See also STYE.

Eylau, **Preussisch**, see PREUSSIAN EYLAU.

Eyra, native S. Amer. name for a species of wild cat, *Felis eyra*, which ranges through the W. hemisphere from Mexico to Paraguay. It is reddish-yellow, with white spots on the face, and is about the size of the domestic cat.

Eyre, **Edward John** (1815-1901), a Brit. colonial governor and Australian explorer, son of a Yorkshire vicar. He emigrated to Australia, becoming a squatter on the Lower Murray R., a stipendiary magistrate and protector of the aborigines. He undertook difficult journeys to prove the possibility of an overland route between S. and W. Australia. Starting in 1841, he reached Albany in about five weeks, publishing an account of his journey in England, as *Discoveries in Central*

Australia (1845). In 1846 Grey appointed him lieutenant-governor of New Zealand. He was transferred to the W. Indies in 1854, governing St. Vincent and Antigua, and finally became governor of Jamaica in 1862. E. took stern measures to suppress the negro rising there (1865). For this he was superseded by Grant, and prosecuted by a committee of which J. S. Mill was president. Carlyle and Kingsley were on the committee for his defence. He was acquitted in 1867, and retired with a pension. See W. L. Mathieson, *The Sugar Colonies and Governor Eyre*, 1849-1856, 1936; Lord Olivier, *The Myth of Governor Eyre*, 1933.

Eyre, **Sir Vincent** (1811-81), Eng. gen., who served in Afghanistan (1841-42). His *Military Operations at Cabul... with a Journal of Imprisonment in Afghanistan*, pub. in 1843, gave an account of his eight months of captivity with Akbar Khan. He fought in the Indian Mutiny, being with Havelock and Outram at the relief of Lucknow. See memoir by Malletson (*Recreations of an Indian Official*, 1872).

Eyre, **Lake**, lake in S. Australia. It is 4000 sq. m. in area, but in the dry season it becomes a mere salt marsh. Lakes Gairdner and Torrens are similar in character—i.e. when the supply of water is least the evaporation is greatest, whereas in the case of most lakes both supply and evaporation are more or less constant at all seasons.

Eyres Peninsula, triangular piece of land on the S. coast of S. Australia, lying between Spencer Gulf and Anxious Bay, its base being formed by the Gawler range.

Eyre-Todd, **George** (1862-1937) Scottish author, b. at Glasgow; son of Henry Todd. Educated at Glasgow, one time lecturer on Eng. literature and Scottish hist. at Glasgow Athenæum. Later, editor of *The Scottish Field*. His works include: *Ossian* (1888), *Byways of the Scottish Border* (1892), *Abbotsford Series of Scottish Poets* (1891-96); *Ancient Scots Ballads, with their Traditional Airs* (1894), *The Glasgow Poets* (1902), a trans. of Barbour's *Bruce* (1907), *Works of Macrae* (1909), *The Angel of Robert Burns* (1917), *The Legend of Langmuir* (1922), *The Highland Clans of Scotland* (1923), *L. M. & S. Rly.* (1925); *History of Glasgow*, Vol. II. (1929), Vol. III. (1934) (written for the Glasgow Corporation).

Eyston, **George Edward Thomas** (b. 1897) Brit. racing motorist and consulting engineer; educated at Cambridge Univ., where he was a rowing blue. After service in the 1914-18 war he took up motor racing and in Nov. 1937 he broke the world's land speed record with an average speed of 312.20 m.p.h., and, again in Sept. 1938 at Bonneville Salt Flats, Utah, U.S.A., in his 'Thunderbolt' with an average speed of 357.5 m.p.h.

Ezekiel ('E' (God) will make strong'), one of the four greater prophets, is spoken of in ch. I. 3, as 'the priest, the son of Buzi,' and this description by the editor of his prophecies is the only extant reference of another writer to him. On the

capture of Jerusalem by Nebuchadnezzar, he was carried into Mesopotamia with Jehoiachin, king of Judah, and settled at Tel-abib on the R. Chebar. Here in the fifth year of the captivity (592 B.C.), the call to the prophetic office came to him. He continued it for twenty-two years. It is noteworthy, then, that E. was both prophet and priest, and it is this unique blending of the two which makes his work remarkable. The influence of Jeremiah is particularly strong in his writings. The book of E. has never had its authenticity severely questioned, though a Talmudic tradition ascribes the authorship to the great synagogue, to which E. did not belong. It may be divided into two great parts, the div. coming at the end of either ch. 32 or ch. 39. Chapters 1-39 fall into three divs.: (1) before the siege of Jerusalem, threatening the complete overthrow of the kingdom of Judah on account of its alienation from God; (2) during the siege, threatening the surrounding nations with divine punishment for their scorn of Judah; (3) after the siege, an exultant prophecy of the future. See J. Smith, *The Book of Ezekiel*, 1931; J. Harford, *The Book of Ezekiel*, 1935; A. Guillaume, *Prophecy and Divination*, 1938; H. Robinson Wheeler, *Two Hebrew Prophets: Studies in Hosea and Ezekiel*, 1948.

Ezija, see ECIJA.

Ezo, see YEZO.

Ezra, the Scribe, is said to be one of the descendants of Sheraiah the high-priest who had been put to death after the taking of Jerusalem by Nebuchadnezzar. He first appears in the Biblical narrative as a Jewish exile, living in Babylon during the reign of Artaxerxes Longimanus, by which monarch he was held in great favour. After the seventh year of the reign of Artaxerxes, he was permitted to lead a band of from 1400 to 1600 men with women and children out of Babylon to Jerusalem. In Ezra vii. is given the decree by which Artaxerxes makes the arrangement for this journey, but advanced critics are agreed in declaring it to be spurious. On his arrival at Jerusalem, E. found that the Jews had intermarried with the surrounding nations, and on the authority of the law he called upon them to sever this connection. The result was the institution of a special 'congregation' devoted to the temple and the law. E. is noted as a restorer of the text of the law, and was held in high

repute by later Jews. See *Primitive Christianity*, 1711.

Ezra and Nehemiah, the Books of, naturally form one work, both being continuations of the books of Chronicles. It is impossible to consider them apart, as both are constructed from the same sources, and both have undergone the same revision. The book of Ezra falls into two parts, of which the first, chs. i.-vi., tells the hist. of the Palestinian Jews from the first year of Cyrus down to the sixth year of Darius Hystaspes. Of this section, the portion from iv. 8 to vi. 18 is written not in Heb., but in Aramaic, the common tongue of the Semitic peoples at this time. The second div. of the books, chs. vii.-x., describes the return of Ezra and his company in the seventh year of Artaxerxes, and his action with reference to the mixed marriages. In the original ch. vii. 12-26 is in Aramaic. The book of Nehemiah tells how that Jewish leader was sent by the Persian king as governor of Jerusalem to restore the walls of the city, and describes the manner in which he carried out his work in face of the opposition of Sanballat. The whole work is of a piece with the Chronicles, and was written in close connection with them. There are some difficulties in regard to the chronology of the two books which have not yet been cleared up. See H. H. Howorth, *Unconventional Views*, 1901; G. Bose and W. Sanday, *The Ezra Apocalypse*, 1912.

Ez Zebdani, prosperous tn. of Syria, about 20 m. N.W. of Damascus, surrounded by celebrated apple orchards and vineyards. Not far off is a remarkable rock-pinnacle, resembling an uplifted finger, which appears to have been a sacred pillar worshipped as a Symbol of Baal Moloch. Even to-day it is venerated by the Muslim peasantry, and is visited by processions of Dervishes. Once every year at Zebdani a Muslim sheik of approved sanctity rides on horseback over the prostrate bodies of fanatics who voluntarily permit themselves to be trampled upon.

Ezzelino da Romano (1194-1259), It. Ghibelline leader, was descended from Eccelin, a knight, who had received the fief of Romano, near Padua, in Italy. E. had such a reputation for cruelty that he was called 'the tyrant,' and we find him pictured in Dante's *Inferno*. He has also been made the subject both of a drama by Eichendorff (1828), and of a novel by Canth (1838).

F, the sixth letter of the Eng. alphabet, had originally (i.e. in the Semitic alphabet) the phonetic value of *v-w*, and was called *waw*. A form of it became the Gk. *digamma*, which was a consonant having the value of *w*. In some Gk. dialects, however, there was no need for this letter, and it was given up; in others it survived, but gradually it was discontinued and finally it only survived as the numeral 6. Another form of the Semitic *waw* became the Gk. *upsilon* (see the letter U). The Etruscan alphabet, being of early Gk. origin, contained the *digamma*. The Etruscans, however, expressed the sound *f* either by a sign having the form of figure 8, or by the combination *w-h*. Also the Romans adopted this combination to express the sound *f*, but at a later stage the *h* was dropped. Thus the Gk. *digamma* (F) came to represent the Lat. sound *f*, whereas the Gk. *upsilon* was adopted both for the consonant *v* (q.v.) and the vowel *u* (q.v.). The Lat. F was taken over by all alphabets descended from the Rom. character.

F is a 'voiceless labio-dental spirant.' Etymologically it corresponds in general to the Gk. *φ*. Cf. Enk. 'father,' Gk. *πατήρ*; 'foal' and *πῶλος*; 'five' and *πέντε*; 'fire' and *πῦρ*. In O.E., if between two vowels, *f* was pronounced like *v*. In modern Eng., the word 'of' is the only example of this sound for *f*. The letter F is used in various abbreviations, e.g. for 'fellow' (F.R.S.), 'Fahrenheit,' 'Fluorine' (in chemistry), and others. See also ALPHABET.

F, in music, is the fourth note in the ascending diatonic scale of C, major and minor, the sub-dominant of the scale. The bass or F clef is on the fourth line of the staff, the note on that line being F, and the other notes above and below being named accordingly (*g*, *a*, *b*, etc.). The scale having the note F as its tonic is the scale or key of F. It represents 'forte' (loudly) in music, being usually written *f*; *ff* stands for 'fortissimo' or 'piu-forte.'

F., Fahr. (abbr. for *Fahrenheit*), the name applied to a thermometer, so called from its inventor, Gabriel Daniel Fahrenheit, who substituted mercury for spirits of wine, thereby greatly improving the instrument.

Fabaceæ (in botany), see LEGUMINOSÆ.

Fabroni, A., see FABRONI A.

Faber, Cecilia Francisca Josefa Böhi von (1797-1877), Sp. novelist, who used the pseudonym of 'Fernan Caballero.' She was born at Morges, in Switzerland, and in 1813 her father, a Ger. merchant who had married a Sp. lady, settled in Spain with his family. Her first novel, *La Gaviota*, was pub. in 1849. She also pub. *Cuentos y Poesías populares Andaluces* (1869), the earliest collection of Sp. folk-tales and songs.

Faber, Frederick William (1814-63), Eng. Oratorian and hymn-writer, nephew of G. S. Faber, born at Calverley, Yorkshire. Till 1845 he remained a clergyman of the Anglican Church, and was then converted to Catholicism, and was ordained priest. He founded a religious community at Birmingham, later merged in the oratory of St. Philip Neri, with Newman at the head. In 1849 a branch was formed in London, with F. as president. His *Collected Hymns* were pub. in 1861, including 'O Gift of Gifts, O Grace of Faith,' and 'Paradise, O Paradise'; and his complete works in prose and verse in 1914. See J. E. Bowden, *The Life and Letters of Frederick William Faber*, 1869; G. C. Faber, *Oxford Apostles*, 1933.

Faber, George Stanley (1773-1854), celebrated Anglican divine, uncle of F. W. Faber, b. in Yorkshire. He graduated from University College, Oxford, became fellow and tutor of Lincoln College, Oxford, 1793; Bampton lecturer, 1801; rector of Stockton-on-Tees, Durham, 1803. In 1832 F. became master of Sherburn Hospital. His greatest book is *The Origins of Pagan Idolatry* (1816). Among his other works are: *Horæ Mosaicæ* (1801), *On the Mysteries of the Cabiri* (1803), *Difficulties of Infidelity* (1824), *Difficulties of Romanism* (1826), *View of the Prophecies Relating to Judah and Israel*; and *The Sacred Calendar of Prophecy* (1828), *The Primitive Doctrine of Justification* (1837), *Eight Dissertations upon the Prophetic Promises of a Mighty Deliverer* (1815). See G. S. Faber's memoir in *Many Mansions in the House of the Father*, 1854.

Faber or Fabri, Jacques (c. 1455-1536 or '37), Fr. humanist and precursor of Protestantism; properly, J. Lefèvre d'Étaples, latinised into J. Stapulensis; b. at Étaples. Went early to Paris to study; in 1486 to Italy, where he remained sev. years. On his return, he propagated Aristotelian principles, by trans. and paraphrases. F. met an old pupil, Guillaume Briçonnet, who had become bishop of Lodève, and who accommodated him in the abbey of St. Germain-en-Laye. He made a Fr. trans. of N.T., and his biblical commentaries aroused the antagonism of the Sorbonne. Removed to Meaux (of which Briçonnet had become bishop), he was protected by Francis I. Later accompanied Marguerite of Valois to Blois, where he finished trans. of Bible. In 1531, Marguerite removed him for greater safety to Nérac, where he died.

Faber or Fabri, Johannes (1478-1541), Ger. theologian; b. at Leutkirch in Swabia. Real name, Helgerlin. Studied theology and canon law at Tübingen and at Friburg in Breisgau, became doctor in canon law. In 1518 he was appointed vicar-general of the diocese of Constance.

He was friendly with Erasmus, Melancthon, and Zwingli: but, when the breach came, he chose the orthodox side, and became known as the Hammer of the Heretics—from his work, *Malleus . . . in Næræsim Lutheranan* (Cologne, 1524). He was prominent in many disputations and in 1531 became bishop of Vienna, where he died.

Faber, John (1684–1756), *see under* ENGRAVING.

Faber, John (Johan), the Elder (c. 1660–1721), Dutch mezzotint engraver and draughtsman, b. at The Hague. One of the first artists to work in mezzotint, he came to London about 1687, and died at Bristol. His pen-portrait of 'Simon Episcopus' on vellum is in the British Museum. Among his other best works are 'Portraits of Founders of Colleges at Oxford and Cambridge' (begun 1712): 'The Heads of the Philosophers' (after Rubens); 'Humphrey Lloyd of Denbigh, Antiquary,' 1717; 'Dr. Wallis, Mathematician' (after Kneller); and portraits of Bishops Atterbury and Hough, of John Caspar and Dr. Sacheverell.

Fabia (orchid), *see* ORCHID.

Fabia gens, one of the oldest and most distinguished patrician clans or houses of anc. Rome, probably of Sabine origin, claiming descent from Hercules and a daughter of the Arcadian Evander. It was one of the two gentes entrusted with the management of the 'Lupercalia' (Ovid, *Fasti*, ii. 375). The chief family names under the republic were Ambustus, Buteo, Labeo, Licinus, Dorsio, Vibulanus, Pictor, and Maximus. Among its most famous members were:

(1) *Cæso Fabius Vibulanus*, Rom. general, who with his brothers, Quintus and Marcus, held the consulship for seven years (485–479 B.C.), being consul himself 484, 481, and 479. He was popular with the plebeians, and won victories over the Volentes and Æqui. In his third consulship, the Fabian family made a campaign against Veii alone. Cæso led out 307 of them, and they settled on the Cremera. After gaining some successes they were trapped in an ambush and all slain by the Volentes, except one youth (477 B.C.). (*See* T. Mommsen, *Römische Forschungen*, vol. ii. 1855).

(2) *Quintus, Fabius Maximus Rullianus*, a famous general, consul five times between 322 and 295 B.C. He was twice dictator of Rome, fought in the second Samnite War, gaining victories (325, 322), and at Sentinum, over united Gauls and Samnites (295). (*See* Livy, viii., ix.)

(3) *Quintus, Fabius Maximus* (nicknamed Verrucosus and Ovicular), known to fame as 'Cunctator' (delayer), described by Ennius as 'unus qui nobis cunctando restituit rem,' was repeatedly consul, censor, and dictator of Rome (221, 217 B.C.). As consul (233) he conquered the Ligurians and was granted a 'triumph.' Sent as ambas. to Carthage, he became leader and dictator in the war with Hannibal. His slow, defensive policy, known ever after as 'Fabian' (*cf.* FABIAN SOCIETY), did not at first favour with his contemporaries,

but after the crushing defeat at Cannæ (216), it was at once resumed. In 215 Maximus ravaged Campania, was consul for the fifth time (209), and recaptured Tarentum. He opposed Scipio's aggressive policy, and died in 203 B.C.

(4) *Quintus, Fabius Pictor* (b. c. 254 B.C.), first Rom. prose historian, the 'father of Lat. hist.,' lived at the time of the Second Punic War. He served in the Gallic War (225), and died after 216. His works (written in Gk.) were known as *Annals of F. Pictor*. Only fragments of his hist. (from the time of Æneas to the Hannibalic war) are left.

Fabian Society, an association founded in London (1883) for the advancement of Socialism. Similar organisations now exist in many other cities. Its rise was due to private discussions on literature and the social duties of the times, started by an Amer., Thomas Davidson, who called his society the 'Fellowship of the New Life.' Meetings were first publicly held in 1888. The name is adopted from the famous Rom. Fabius 'Cunctator,' in token that the Society desires to fulfil its aims gradually (it was Mr. Sidney Webb [later Lord Passfield] who first used the phrase 'the inevitability of gradualness') by educational and legislative methods, and not by any sudden violent upheaval. Among its earliest members were George Bernard Shaw, Sidney Webb, Sydney Olivier, and Graham Wallas. In 1885 there were about forty members. They were as 'vaguely anarchistic and insurrectionist in their ideas and their expression of them as any group that had existed before them' (Shaw). But the forty members and those who joined them within the next two or three years contained sev. who united intellectual ability to an appreciation of practical possibilities; and soon after the failures of Labour agitation at this time, they used their own critical abilities, and in 1886 began to prepare a series of proposals to deal with unemployment. This was 'the first tract that contained any solid information,' says Mr. Shaw. Like the early Fabian documents it was the work, not of one hand, but of a group, one of whom was Sidney Webb. But it was too mild for the zeal of most of the members of the society. In the following year, however, was issued *Facts for Socialists*, of which the fifteenth ed. appeared in 1944. Next to the *Fabian Essays*, this is the most characteristic of Fabian pubs. *Fabian Essays in Socialism*, to give the full title, were delivered first as an unadvertised series of lectures in London, ed. by G. B. Shaw and pub. by the F. S. at its own expense. The seven essayists were Bernard Shaw, Sidney Webb, William Clarke, Sydney Olivier (later Lord Olivier, Governor of Jamaica), Graham Wallas, author of *Human Nature in Politics* and a prominent member of the London School of Economics, Annie Besant, who later forsook the society for theosophy, and Hubert Bland, for thirty years treasurer of the F. S. The *Essays*, having no such emotional appeal as e.g. Henry George's *Progress and Poverty*, did not

secure the circulation of the latter; but they undoubtedly appealed to persons with Radical leanings in need of a philosophy, and when, a few years later, the Independent Labour Party was formed that body took its philosophy as well as many of the facts used in its propaganda direct from Fabian sources. The *Essays* derive directly from the Utilitarians in politics. Shaw's contribution shows its origin in the economics of Ricardo. Webb's essay, entitled *Historic*, was on 'The Development of the Democratic Ideal,' his inspiration being the writings of Bentham and J. S. Mill. Olivier's was on the morals of Socialism but was not a noteworthy contribution as compared with the others. The *Essays*, though signed by their individual authors, were a collaboration, and each separate contribution was criticised by the other contributors and by the editor before it was admitted in its final form. *Facts for Socialists* consists of true statements drawn from authoritative sources and are facts for Socialists to use in converting the country to their views. Led by Shaw and Webb, the Fabian Society had come to believe that out of the mouths of its own papers, its own records, and its own statistics, Socialists could convict capitalism of inefficiency as well as immorality, and leave it, in the minds of those who could read and listen, without a leg to stand on,' (Margaret Cole). *Facts for Socialists* was the first fruit of this belief which Sidney and Beatrice Webb later coined into a phrase 'measurement and publicity', and it may fairly be said that the immense mass of the pub. works of the Webbs is in fact a vast expansion of *Facts for Socialists*, particularly on local gov. and trade unionism. A latter-day pub., *Fabian Colonial Essays*, issued in 1945, shows the extension of Fabian principles to the field of colonial reform; but not all the contributors reveal the same outlook of Socialism as the antidote to undesirable conditions in the 'backward' parts of the Brit. Colonial Empire. See E. Pease, *History of the Fabian Society*, 1916; G. B. Shaw, *Early History of the Fabian Society*; G. D. H. Cole, *The Fabian Society, Past and Present*; and Margaret Cole, *The Fabian Society over Sixty Years*.

Fabii, see FABIA GENES.

Fabius, Planciades, see FULGENTIUS.

Fable (Lat. *fabula*, story). The term F., at one time applied to any fictitious narrative, is now more often restricted to a particular kind of literary composition, in prose or verse, of a more or less humorous nature, in which beasts or even inanimate objects are the actors and speakers and a moral truth is brought home to the reader by their means. According to Dr. Johnson, 'a "F." or "apologue" seems to be, in its genuine state, a narrative in which beings irrational and sometimes inanimate (*arbores loquuntur, non tantum ferae*) are, for the purpose of moral instruction, feigned to act and speak with human interests and passions.' The definition of La Fontaine is a poetic rendering of this. His name is

pre-eminent in this connection, and while other Fr. writers of Fs. (Marie de France, Corrozet, Florian) are only classed as 'fabulists,' he is known as 'le fablier.' Fs. differ from myths in that they are intentionally made or invented, whereas the latter merely grow and develop out of existing legend. Parables and Fs. are very much akin, their use being strictly parallel to the use of metaphor. Neander's distinction was that in Fs. human passions and actions are attributed to beasts, but in parables the lower creation are only employed to illustrate the higher life, and the bounds of probability and possibility are never exceeded. There is often a close affinity between Fs. and proverbs. The origin and diffusion of Fs. is a much-discussed subject, but it seems probable that their earliest home was Hindustan. They arose out of the beast Fs. of savages, and the moral element appears to be a later development, essential to the F. as we understand it at the present day. La Fontaine, who describes his Fs. as 'une ample comédie à cent actes divers,' says that an apologue has two parts, body and soul (the story and the moral).

Among the earliest known examples are *Pancha Tantra*, or *Fables of the Brahma Vishnu Sarmam* (second century B.C.); *Katilah*; and *Dinma*, or fables of Bidpai (Pulpai), of which *Hipodésa*, a modernised form, has three Eng. trans. These passed from India through Persia and Arabia, finally to W. Europe. Other E. collections were those of the Arabian Lokman, and Buddhaghosha's *Parables*. Æsop, famous among the Gks. (c. sixth century B.C., Herod. ii. 134), doubtless derived many of his fables from such E. sources. (See versified version of Babrius, third century A.D., and J. Jacob's ed. of *The Fables of Æsop*, 1889). Phædrus was the Rom. imitator of Æsop. Horace's fable of *The Town Mouse and the Country Mouse* seems to have a purely Rom. origin, unlike any others. The names of Aphthonius (c. A. D. 400) and F. Avianus form a link between classical and medieval writers of Fs. The oldest known Ger. writer is Stricker (thirteenth century), but the medieval *Reineke Fuchs* goes much further back. Other names deserving of mention are Gellert (1716), Lessing (1759), Hagedorn, Pignotti, Kryloff (trans. by Ralston), Prior, Gay, Andersen, Yrlarte (*Blackwood's Magazine*, 1839). Kipling's *Jungle Book*, Rostand's *Chantecler*, and Maeterlinck's *L'Oiseau Bleu* may be considered as modern revivals of the fable-form in literature. J. C. Harris's *Uncle Remus* (Brer Rabbit) tales are not properly fables, but records of the folk-lore of the African-Americans. Theodor Benfey (1809-1881), Emmanuel Cosquin (1841-1922), and Joseph Jacobs (1854-1916) are all modern writers on folk-lore. See G. E. Lessing, *Über das Wesen der Fabel*, 1760; Robert, *Fables médées des XII^e, XIII^e et XIV^e siècles* . . ., 1825; Jakob Grimm, *Reinhart Fuchs*, 1834; Keller, *Untersuchungen über die Geschichte der griechischen Fabel*, 1862; E. B. Tylor, *Primitive Culture*, vol. i., 1871; O. Weddigen,

Das Wesen und die Theorie der Fabel, 1893; K. T. Murray, *Selected Fables*, 1920.

Fabliaux, group of entertaining compositions, in the form of tales in eight-syllable rhymed verse, numbering over 100, and forming a marked section of Fr. medieval literature. The word 'fabliau' is really a diminutive of 'fable.' A fabliau always had reference to some event and was usually satirical and comic in quality. F. seem to have existed as early as the eighth century; but all the early examples are lost. The oldest preserved appears to be *Richeut*, about 1136, and the most modern are those of Jean de Conde and Watrquet at the beginning of the fourteenth century.

Fabre d'Eglantine, Philippe François Nazaire (1755-94), Fr. dramatic poet, b. at Limoux, and beheaded in Paris. In spite of the hostility of his many enemies, he was successful with his *Le Collatéral* and was thereby encouraged to follow it up with his *Philinte de Molière ou la Suite de Misanthrope*, which remains his masterpiece. *L'Apothécaire* followed in 1790, but in 1794 he was arrested by the Committee of Public Safety on the charge of forging a decree of the National Convention relating to the company of Invalides. Robespierre, who prosecuted, had no real belief in the substance of the accusation, but later he was charged with enriching himself in the course of his public duties for the revolutionaries, though in fact he was an ardent supporter of the Revolution. His verse is somewhat difficult, but his comedy is well conceived if inappropriate in expression.

Fabre, Jean Henri (1823-1915), Fr. entomologist; b. at Sainte-Léonie in Aveyron. In middle life was prof. at the Natural Philosophy College of Ajaccio and the Lycée of Avignon. He was an opponent of evolutionary theory. He retired in 1871 to Sérignan where he died. F. wrote some of the most fascinating books on insects ever produced. They are filled with acute observations on the life and death of the creatures and are of deep interest to laymen. They have been trans. into all modern languages. Among his works are *Life and Love of the Insect* (1911) and *Social Life in the Insect World* (1912).

Fabri, Jacques, see FABER, JACQUES.

Fabri, Johannes, see FABER, JOHANNES.

Fabriano, city of Italy in the prov. of Ancona, 44 m. S.W. of the city of Ancona. It is situated at the base of the Apennines, and possesses a cathedral and the Rosenti Museum. The manufs. are paper and parchment. In the Second World War the cathedral roof was damaged, as also were the churches San Biagio, Santa Caterina and Santa Maria del Popolo and the Bishop's Palace. Pop. 9000.

Fabriano, Francesco di Gentile Da (c. 1360-c. 1423), It. painter, b. at Fabriano, and called after his b.p. He belongs to the early Umbrian and Sienese schools, and painted chiefly in Florence, one of his finest extant pictures being the 'Adoration of the Kings' painted for the church of the Holy Trinity in Florence. A 'Madonna with Saints,' now in Berlin

Museum, belongs to the same period. In 1426 he executed paintings for Pope Martin V. in the church of San Giovanni, Rome; but this, together with other works, has been destroyed. His pictures indicate, for the most part, a joyful and cheerful disposition, and he had a great love of splendour and rich colouring. F. belongs to the transition period of the fifteenth century.

Fabricius, Gaius, surnamed Luscinius (i.e. 'the one-eyed'), Rom. general and statesman of the fourth and third centuries B.C., in later ages renowned as a model of incorruptibility. He was the first member of the Fabrician gens to settle in Rome. After the defeat of the Romans by Pyrrhus in 280 at Heraclea, F. was sent to treat for ransom, and though Pyrrhus attempted to bribe him, all attempts were vain. During his second consulship, F. was successful in negotiating terms of peace with Pyrrhus. He gained a series of victories over the Samnites, Lucanians, and Brutians, and on his return to Rome received a triumph. In 276 F. was censor, and carried out with great vigour the old Rom. sumptuary laws.

Fabricius or Fabrizio, Girolamo (1537-1619), an It. anatomist and surgeon, educated at the univ. of Padua. He studied medicine under Fallopius. Harvey, the discoverer of the circulation of the blood, was amongst his students. His chief work is his *Opera Chirurgica*.

Fabricius, Jan, Dutch dramatist, b. at Assen, 1871. He went to Batavia in 1892 and took up journalism, taught himself Eng., Fr., and Ger., and returned to Holland in 1902. After an unsuccessful venture as a tourist agency and a return to the Dutch E. Indies he came back home in 1914 and made a great success as a dramatist. His works include *Met den handschoengetrouwd* (1906), *Onder één dak* (1914), *Nonni* (1916), *Demon* (1922), *Cesare als Gastheer in de Gevangenis* (1927), *Mrs. Jim* (1938) and short stories *Glimpses of Java* (1939). He lives in England.

Fabricius, Johannes Albertus (1668-1736), Ger. classical scholar and bibliographer, b. at Leipzig. His great reputation is founded on his two literary synopses, the *Bibliotheca*. At different times of his life he studied both medicine and theology, and he is known among theologians for his collections of apocryphal and pseud-epigraphical literature.

Fabrics, Textile, the name applied to those F. produced by weaving, and embraces the production from various raw materials of cotton, wool, silk, flax, hemp, jute, and synthetic substance (made from wood, coal, etc.) which provides remarkable variety of surface. The simplest form of T. F. is the primitive method in which the threads cross at right angles, regularly passing over and under one another, and a great variety of goods can be made in this way. The checks and stripes in the Scottish clan tartans are thus produced, and the thick corded effect, obtained in materials of the *repp* nature. The production of pile F. is one of the most important developments of plain weaving. They are woven with two warps, one being

looped over crossed wires, and the other standing out above the main body of the cloth. The loops are either cut, or remain uncut. An instance of the former treatment is shown in the *Wilton* carpet, and of the latter in the *Brussels* carpet. Chenille used with such good results in tapestry and carpets, is another example of the plain 'weave.' Historically, T. F. are of ant. date. Homer and other early writers speak of the weaving of the Gks. who used to work (principally in wool) designs and patterns of mythological subjects on their tapestries. The Egyptians also were celebrated from quite early times for their T. F.

The supply of raw material and the adaptability of the people to a manufacturing life are the chief influences which control the estab. of the textile industry in any particular country. The earliest forms of machinery used were the hand-loom and spinning-wheel, and the manuf. of homespun from wool was one of the first of textile industries to spring up among the people. It has now secured a foothold in nearly all countries in which wool F. are required for clothing. The fabrication of cotton had its greatest growth in India, and the industry has developed to a considerable extent of recent years in China, Japan, the E. Indies, and Mexico. It is in the S. U.S.A., however, that the most wonderful growth of this industry has taken place; and its steady advance is evidenced by the fact that more and larger mills have been built, and the old ones developed and enlarged.

To China and Japan we owe our fine and beautiful F. of silks. The silkworm flourishes in these countries and labour is cheap and plentiful. These nations (in normal pre-World War years) produced F. of a costly and beautiful nature, which could not be equalled by the more highly-civilised nations; though the introduction of the silkworm into Central and W. Europe caused a wonderful increase and advance in the manuf. of silks in France, Italy, Switzerland, and Austria. The Gers. (prior to the Second World War), too, and the U.S.A. in recent years made a great success of the industry. In England alone the industry seems to have declined a good deal during the last sixty or seventy years, though the cotton industry, during the same period, developed to an extraordinary degree. The silk industry was developed in the U.S.A. in 1870, and since then has made exceedingly rapid growth. It is now, however, being produced synthetically in the form of Nylon. A new use for Nylon is a mixture fabric, at present being made mainly for export only. A nylon thread is worked in with ordinary wool. The material which results is a nylon-worsted. At present it is a lightweight fabric suitable for women's clothes, but may in the future be used for men's suitings. The main advantages are its extra hard-wearing quality.

Although statistics are not available, it is probable that in the 1930's the E. nations, China and Japan, led the way in the manuf. of silk. The growth of the

textile industry in Europe was made difficult before the Second World War by the rapid changes of fashion, largely brought about by the desire of big manufacturers to produce the material and effect attractive to buyers, and their unwillingness to keep in stock F. that are out of fashion.

Textiles may be said to reflect the life of nations, and, in the Victorian era, people became insensitive to beauty in their scramble for wealth; pattern and design were ignored, and there was a lack of taste and need for selection. Much is owed to Wm. Morris, and a few of his contemporaries for giving us among other things beautifully designed textiles. His silks, chintz, and tapestries were exhibited in the first Arts and Crafts Exhibition in 1888; and Sir Arthur Liberty, renowned for his soft satins and soft 'Liberty' designs, exhibited textiles at the Paris Exhibition in 1889. These beautiful Fs. contrasted with the crude colourings prevalent in the 1880's. In the early twentieth century there was a marked distaste for patterned textiles (with the exception of the Morris Productions) and the 'Art Nouveau' evolved, plain textiles and wall coverings prevailing. However, in 1911, Picasso and the first Post-impressionists exhibited their work in London, and as a result colour and abstract design became the vogue. Sir Ambrose Heal, Wm. Foxton, and others, provided modern designs in textiles; and, after the First World War, Tootal Broadhurst Lee, The Edinburgh Weavers, Morton Sundour, and others, brought out new weaves; distinctive painters were commissioned as designers; and the local Art Schools also had their influence on fabrics and design. Material and machines increased, dyes improved and a fast dye evolved. Some weaving was almost three dimensional, textiles having fringes, ridges, knobs, etc. Tweeds were used for furnishings; and, in 1928, abstract design was uppermost. In the years following, bright colours gave way to neutral tones; and in the Exhibitions of 1933 and 1935 more or less Cubist design was being used in Brit. textiles. Later, this yielded to conventional patterns of natural objects—leaves, flowers, etc. Design became all important, and Modern Textiles, formed by a group of artists for the production and sale of well designed textiles, included among its designers such famous artists as Paul Nash. Unfortunately, the Second World War stopped all this in Britain, for the time being; but recently much effort has been concentrated on textile design for export mkt., and exquisite figured orandies, smart printed piques, printed woollen goods of such fineness that they have to be woven on a carrier which is afterwards melted away, are being produced. Perhaps one of the most interesting ventures is that of Morton Sundour in Unit designs, by means of which certain basic lines and colours can be interchanged or enlarged to make a variety of patterns. (See Noel Carrington and Muriel Harris, *British*

Achievement in Design, 1946.) See also CARPETS; DESIGN; DIAPER; and articles on cotton, flax, and other materials. See T. R. Ashenhurst, *Wearing and Designing of Textile Fabrics*, 1893; A. Barker, *Analysis and Reproduction of Textile Fabrics*, 1894; W. Morris, lecture on Textiles in *Arts and Crafts Essays*, 1899; R. Glazier, *History of Textile Fabrics*, 1923; J. Read, *Textile Design and Fabric Structure*, 1931; Grace Lovat Fraser, *Textiles by Britain*, 1948; and *The Textile Manufacturer's Year Book*.

Fabrizi, Nicola (1804-85), It. patriot, was b. at Modena. He estab. himself at Malta and aided Crispi in the revolutions of 1848 and 1860. Landing at Pizzolo, he joined Garibaldi at Palermo, and was governor of Messina and minister of war under the Garibaldi dictatorship. In 1866 he was chief of staff to Garibaldi. His political aims were to secure the return of Crispi to power and to obtain concord among the chiefs of the Left party. F. was whole-hearted in his passion for liberty, to which he devoted his whole life.

Fabroni (Fabroni), Angelo (1732-1803), famous It. biographer, sometimes called 'the Plutarch of modern Italy.' Educated at Faenza and Rome, he was a good Lat. scholar, and appointed tutor to the sons of Leopold of Tuscany (1773). His chief work is *Vitae Italorum Doctrina excellentium qui Saeculis XVII. et XVIII. floruerunt* (1778-1805). F. became prior of the church of San Lorenzo, Florence, 1767. He also wrote *Laurenti Medicei Vita* (1781) and *Vita Magni Cosimi Medicei* (1788-89).

Facade (from the It. *facciata*, *faccia*, the face), front exterior of a building. It is generally used in referring to the front elevation of more important buildings of considerable magnitude, though the term is not necessarily restricted to these. It is usual, however, to speak of the 'front' of a house, and the F. of a palace, cathedral, etc. The back elevation is spoken of, as the 'rear' F., and the side, as the 'lateral' F. The sides of a court are also called Fs., and distinguished as the E. or W. Fs., etc. The term originally was used to describe the outline of the aisle terminations, but it was later adopted as a design complete in itself, and used in secular and eccles. building.

Facatativa, tn. of Colombia, in the dept. of Cundinamarca, 20 m. N.W. of Bogotá. Elevation about 8500 ft. It was formerly a fortress of the Chibcha Indians, whose last chief was killed here in 1538. Pop. 8000.

Fachinetti, Giovanni Antonio, see INNOCENT IX.

Faciolati, Jacopo (1682-1769), It. lexicographer and philologist, b. at Torreglia, near Padua. The revival of the study of ancient literature was the chief subject to which F. gave his attention, and with the assistance of his pupil, Egidio Forcellini, he brought out a new ed. of the *Lexicon septem Linguarum*. F.'s mastery of Lat. style, as displayed in his epistles, has been much admired for its purity and grace. He was known throughout Europe as one of the most enlightened and zealous teachers of the time.

Facia, see FASCIA.

Facial Angle is formed between a line drawn from the nostrils to the ear and another line from the nostrils to the forehead. It is an important feature of anthropometry, or the method of measurement used in anthropology. A protruding jaw indicates an animal type, and, therefore, the highest, most intellectual type of face indicates almost a right angle. Camper (1722-89) was among the first to define the F. A., his followers including Cloquet, Jacquart, Cuvier, and Kollmann. See ANTHROPOLOGY.

Facility, in Scottish law, a word applied to mental deficiency to differentiate it from idio. If a person voluntarily places himself and his property under the care of one or more trustees, the case is called one of *voluntary interdiction*. The persons so engaged are called interdictors, and a facio person may not transact business—or, if he does, it is null—without the consent of the interdictors. If the court of session appoint interdictors for a facio person, the case is called one of *judicial interdiction*. Even in cases where there has been no interdiction, a contract signed by a facio person is null if it can be proved that such a person was imposed upon contrary to his own interests.

Factor, mercantile agent employed to transact business for another. He is entrusted with the management and disposal of goods, his remuneration for which is called factorage or commission. Unlike a broker, a F. buys and sells in his own name. The first Factors Act was passed in 1825, in the reign of George IV. It enacted that a F., entrusted with the goods of another should be recognised as the legal owner of those goods, so far as to give validity to any contracts made by them with any persons dealing on the faith of that ownership.

Factor (Lat. *facere*, to make), in mathematics, is a number which, when multiplied by other numbers, makes up the product. Each of the numbers so multiplied is called a F. Thus 3 and 2 are Fs. of 6, since $3 \times 2 = 6$. A F. may also be called a *divisor*, because a product can be divided by any of its Fs. without remainder. The Fs. of 12 are 2, 3, 4, and 6, and of $x^2 - y^2$ are $x + y$ and $x - y$. When a number cannot be divided without remainder by any number except itself and unity, it is called a *prime number* (q.v.). Thus 2, 3, 5, 7, 11, 13, 17, etc., are prime numbers.

Factor, Judicial (from Lat. *facere*, to do), in Scotland is an officer appointed by the Sheriff Court for the purpose of managing property on behalf of one who is for some cause or other incapable of managing it himself.

Factory Legislation—Great Britain. The Factory and Workshop Acts (all of which were repealed and in part reenacted in the consolidating Act of 1937) have for their object the amelioration of the conditions under which the various classes of workers conduct their operations. The foremost provisions of these Acts are those which regulate the sanitary or hygienic condition of the workplaces,

and those which relate to the safety of workpeople, with especial reference to industrial injury, the limitation and control of working hours, particularly of child workers, the protection of child labour, and the more efficient administration of the Acts by means of factory inspectors. These Acts mark an epoch in the social development of civilisation, and the state of things effected by them at the present day contrasts so vividly with the industrial Eng. of a century ago as to make it incredible that the social regeneration did not come sooner than it did. In the middle of the eighteenth century the country still reposed on the ruins of the medieval hierarchy of classes, with its taint of serfdom and bondage. The rise of the tns. was slowly dissolving the ties of inborn status, but 'the movement from Status to Contract' was only complete with the industrial revolution brought about by the almost synchronous invention of labour-saving devices by Arkwright, Crompton, and others. With these came the beginning of a new horror—the utter anarchy of private enterprise. Gone was the domestic workshop, and in its place came the factory with single rooms crowded with workers specialising on one single process (see also DIVISION OF LABOUR). The doctrine of *laissez faire* and freedom of contract was soon to reap its consequences in the picture of 'women working half naked in the coal mines; infants bound to the loom for fifteen hours in the heated air of the cotton mill and kept awake only by the overlooker's lash; hours of labour for all, young and old, limited only by the utmost capabilities of physical endurance; and complete absence of the sanitary provisions necessary to a rapidly growing population.'

Small wonder that profits were reckoned at hundreds, and even thousands per cent where 'white slavery' was carried to such a pitch that medical observation reported the 'rapid spread of malformation of the bones, curvature of the spine, heart disease, rupture, stunted growth, asthma, and premature old age among children and young persons.' Even the sort of feudal times or, later, agric. labourer, had some sort of personal relationship with his master; the worker, however, being 'free' to contract, took all the incidents of the contract he had 'chosen' to make, the ultimate expression of which was that he was in no better position than the handle or particular part of the machinery, it was his duty to manipulate. First Carlyle, and then Mill, Darwin, Spencer, Ruskin, and others ruthlessly analysed the individualist view of life, either directly or indirectly, by searching accounts of the evolution of the conception of the social organism, and parallel with the development of the lessons derivable from this, public opinion was soon expressing itself in practical legislative measures, antithetical to the dogmas of current political economy; e.g. in Drainage Acts, Local Improvement Acts, Public Health Acts, and the forerunners of the modern Factory Acts.

The first piece of factory legislation to the credit of Eng. statesmen was the Morals and Health Act, 1802, which provided for the ventilation and cleansing of cotton mills and factories, and for the clothing, hours of labour, and religious education of apprentices employed therein. The exciting cause of this Act was no doubt, the epidemic of fever in 1784 in the Manchester cotton mills which directed public opinion to the dangerous and unhealthy conditions to which the child workers were subjected. The Act, however, did little more than remedy the more glaring abuses of the apprenticeship system, and it was not until after the application of steam power to manuf. that the wholesale employment of children called for the next Act, the Cotton Mills Act, passed in 1819. This Act, which the celebrated Robert Owen was partly instrumental in passing, limited the age at which children might work in factories, and the time of their labour to seventy-two hours per week. From that year to 1856 a series of Acts such as the Act of 1844, limiting the labour of children in calico print works to six and a half hours a day; and Ashley's Act of 1845, forbidding night work to women, were passed, containing regulations respecting the safety, hours, meal times, and holidays of children, young persons, and women.

But so far legislation only affected the textile and allied industries. Another great fault in the early Acts was that they were almost totally deficient in provisions for enforcing the law, this matter being left entirely to the individual bias of the local magistracy. In 1825, however, the efforts of Lord Ashley were successful in securing the appointment of the first skilled inspectors, a body of persons whose wide judicial and ministerial powers were in strange contrast to the merely inquisitorial functions of the modern factory inspector. From 1860 to 1864 Acts were passed to include in the existing factory legislation a number of non-textile industries. The Act of 1864 was remarkable for a departure in two directions: (1) it included by the generality of its enactment provisions that benefited all classes of labour irrespective of sex or age, e.g. by providing for more effective ventilation so as to remove injurious gases, dust, or other impurities; and (2) it assimilated its provisions in some respects to those of the Coal Mines Regulation Acts, by adopting the special rules system of these Acts, especially in regard to 'safety' precautions. By the combined operation of the Sanitary Act, 1866, and the Workshops Regulation Act, 1867, local authorities were invested with powers of administration to secure the general sanitation not only of factories but of all places where manual labour was employed in the manuf. or finishing of articles for sale. As may be gathered, the whole course of the legislation up to the great consolidating Act of 1878 was unsystematic and unsystematic. Acts of Parliament were passed purely *ad hoc* to deal with evils the existence of which was only occasionally brought home by the inquiries of

successive Commissions or the representations of men like Robert Owen. The net result was that there were up to 1878 a score of more or less unrelated statutes with a mass of regulations framed by inspectors or others avowedly in pursuance of the provisions of these statutes. In 1878, as the result of another Royal Commission, the Consolidating Act of 1878 appeared. Like all Consolidating Acts (*q.v.*), this Act made some changes; it increased the minimum age of child labour in textile factories to ten; it made

providing by special requirements the conditions under which certain occupations scheduled by the Home Office as unhealthy and dangerous might be carried on; (5) the restriction of the employment of women shortly after childbirth; (6) control of overtime work; and (7) the reduction of the hours of labour for children.

A striking modern feature in 1893 was the first appointment of women inspectors, a principle which was extended subsequently in a number of other directions.



The Times

FACTORIES AND SMOKE: A POTTERIES LANDSCAPE

From the tower of Hanley Parish Church, looking towards Burslem.

provision for holidays and pauses in the continuous hours of the fixed working-day. Into the detailed provisions of this Act it is not necessary to enter, because the additional legislation of 1883, 1889, 1891, 1895, and 1897 soon made it incumbent on the legislature to pass a second Consolidating Act in 1901. The Acts from 1878 to 1895 were directed mainly to: (1) The development of a specialised hygiene in factory life; (2) the more efficient application of the ordinary Public Health Acts to factories and workshops by successive transference of powers from the factory inspectors to local sanitary authorities; (3) the development of provisions for securing a greater measure of safety against accidents, *e.g.* by the adequate fencing of machinery in factories; (4) the development of the system of regu-

There were encroachments in 1891 on the hitherto unfettered power of the employer of exclusively adult male labour to conduct his operations without legislative interference other than in the details of sanitation.

parts of the F.

men were those 1. safety, such as cleanliness and ventilation, means of escape in case of an outbreak of fire, and fencing of machinery, and regulations in regard to dangerous trades. None the less the enhanced stringency in these latter respects of the provisions of the Factory and Workshop Act, 1895, was a considerable concession to the moral obligations towards male adult workers, and it found still more adequate expression in the codifying Act of 1901. The departures of the Act of 1895 in the

requirements as to the sanitary condition of premises in which outworkers were employed and the maintenance of a proper temp. in workplaces of great humidity, and annual returns of persons employed, the investigation of accidents, and the particulars of wages due to piece-workers were all re-enacted and strengthened in the Act of 1901. The Act of 1901 was a much more ambitious piece of legislation than its predecessors. It repealed and re-enacted with new features all the pre-existing Acts. Notable additions were made in the direction of more efficient means for securing sanitation, and for ensuring safety in dangerous trades. The minimum age of child employees was raised to twelve (subsequently further amended by the Education Act, 1918, and the Employment of Women, Young Persons and Children Act, 1920, both repealed and re-enacted by later Acts), and numerous regulations were made for establishing a strong administrative control over the industries included directly or indirectly in the Act. It is desirable to reproduce here the main provisions of the Act of 1901, because, although the Consolidating Act of 1937 repeals all antecedent Factories and Workshops Acts, most of the fundamental provisions of the Act of 1901 are re-enacted in the Act of 1937. The article will conclude with a detailed Summary of the Act of 1937 in which the chief changes introduced by the new Act are specially emphasized.

The Act of 1901 applied to textile and non-textile factories, and to 'workshops,' the difference, generally speaking, being that if mechanical power were used in the particular manufacturing process the place was a factory; if not, and only hand-power was used, it was a workshop. Textile industries being as a rule more deleterious to health than non-textile, the provisions affecting them were more stringent than in the case of non-textile factories and workshops. Such of the provisions of the Act as related to dangerous machines, accidents, and regulations for dangerous trades were also applicable *inter alia* to docks, wharves, quays, and private railway lines or sidings used in connection with factories.

Persons to whom the Act of 1901 applied.—These comprised: (1) young persons, i.e. boys and girls between the ages of fourteen and eighteen, or, where an educational certificate has been obtained, between thirteen and eighteen; and (2) women, i.e. females above eighteen. Men were contemplated no less by this Act than by its predecessors as being able to look to their own interests, and, generally speaking, the only provisions that applied to them were those which were designed to secure efficient sanitation and safety, i.e. those sections which related to cleanliness, ventilation, fencing of machinery, regulations for dangerous trades, and means of escape in case of fire. In the case of women and young persons, there were not only special regulations as to sanitation and safety, but meticulous provisions as to working hours, meal times, holidays, and overtime. Children

(i.e. persons between the ages of twelve and fourteen) were also included in the Act, which contained, for their protection, stringent provisions as to safety and health; and this Act also contained an unconditional prohibition of employment of any child under twelve years of age—in which latter respect the Act supplemented the Elementary Education Amendment Act, 1899, which made it unlawful to employ any child under twelve so as to prevent full time attendance at school. But these and the like provisions (such as those of the Employment of Children Act, 1903, which absolutely forbade the employment of children in any occupation likely to be injurious to life, limb, health or education, regard being had to his physical condition) became redundant, for the Education Act, 1918 (repealed and re-enacted by the Education Act of 1921 which in its turn was repealed by the Education Act of 1944) prohibited altogether the employment of children in factories, workshops, mines, and quarries; and a 'child' in this context was defined (by reference to the Education Act, 1921) to be a person of any age 'up to that at which his parents cease to be under the obligation to cause him to receive efficient elementary instruction or to attend school under the enactments relating to elementary education; and a child will, for this purpose, cease to be of school age at the end of the school term in which he attains the age of fourteen (or fifteen if this age is fixed by byelaw).' Finally, under the Employment of Women, Young Persons and Children Act, 1920, the general prohibition of the employment of children under fourteen was extended to *any industrial undertaking*. (See further under CHILD WELFARE; and for the legislation in regard to children generally, see under CHILDREN ACTS, 1908-33, which Acts amended the Employment of Children Act, 1903.) It may also be observed that the first factory Acts prescribed the minimum age of children allowed to be employed as eight.

Health and safety.—The provisions in the Act of 1901 for ensuring the sanitary condition of factories and workshops, were designed to keep them free from effluvia, secure proper ventilation and periodical lime-washing of staircases, ceilings, and inside walls, and also to prevent overcrowding; and ensure the maintenance of a reasonable temp. As to 'safety' the Act provided that dangerous parts of machinery, like mill gearing and wheel races, must be fenced, means of escape in case of fire provided, and steam boilers kept in proper condition. It regulated the use of self-acting machines by, *inter alia*, disallowing any woman or young person to work between the fixed and traversing part of any such machines and provided that the doors of a factory or workshop must open from the inside. A court of summary jurisdiction was (and is) empowered to prohibit the use of dangerous machines or premises. As to accidents, the Act, as amended by the Notice of Accidents Act, 1906, provided that all serious accidents must be notified

to the inspector of the dist., and in certain cases to the certifying surgeon of the dist. Power was also given to the home secretary to direct a formal investigation of any accident occurring in a factory. The Notice of Accidents Act, 1906 (sects. 4 and 5) was repealed so far as it relates to factories and workshops by the Consolidating Factories Act of 1937.

The 'employment' provisions covered hours and holidays, overtime, night work, and fitness for employment. The hours of employment in textile factories for young persons and women were fixed at a twelve-hour day, of which not less than two hours must be allowed for meal-times. Half-holidays must be allowed on Saturdays. There were exceptions to the above general provisions, especially in the case of five hours' spells in certain textile factories provided the employment began at 7 a.m., and the whole time between that hour and 8 a.m. was allowed for meals. Then followed analogous provisions as to hours in non-textile factories and workshops. Under this part of the Act the employment of females within four weeks after childbirth was prohibited. Employers were also compelled to obtain medical certificates of the fitness for employment of young persons under sixteen. The Act also threw on the employer the duty of seeing that child employees attend school during part of the day.

The Act also compelled the employers in the case of dangerous and unhealthy industries to notify certain industrial diseases contracted in a factory or workshop, such as lead-poisoning, arsenical poisoning, and anthrax.

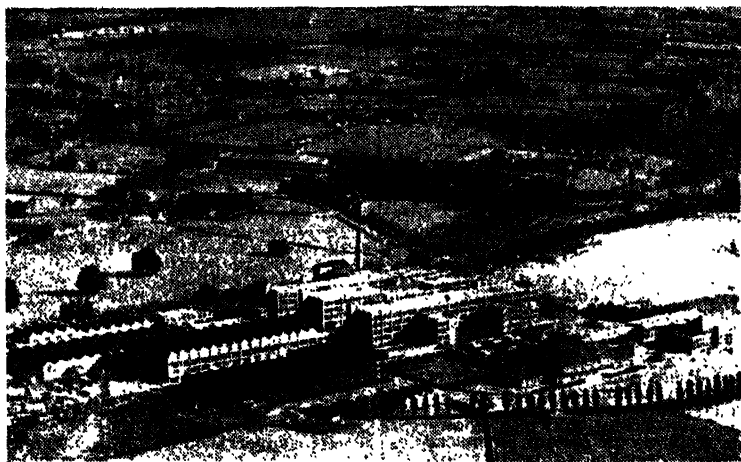
That part of the Act which relates to administration provided for the appointment, duties, and powers of factory inspectors and certifying surgeons. Local authorities were given concurrent powers of entry, inspection, and taking legal proceedings with inspectors.

Since the Act of 1901 the principal amending or additional Acts passed are the Notice of Accidents Act, 1906 (repealed as to the sections relating to factories and workshops and re-enacted by the Factories Act, 1937); the Census of Production Act, 1906; the Factory and Workshop Act, 1907 (repealed and re-enacted in 1937); The Employment of Women Act, 1907 (repealed and re-enacted by later Acts); the White Phosphorus Matches Prohibition Act, 1908 (repealed and re-enacted in 1937); The Shops Acts, 1912 and 1913; the Education Act, 1918 (noticed *supra*); the Employment of Women, Young Persons and Children Act, 1920 (repealed by the Education Act, 1944); the Women and Young Persons (Employment in Lead Processes) Act, 1920 (repealed by the Factories Act, 1937); and a number of other Acts most of which have been repealed and re-enacted, such as the Factory (Workmen's Compensation) Act, 1923; the Lead Paint (Protection against Poisoning) Act, 1926; the Shops (Hours of Closing) Act, 1928; and the Factories and Workshops (Cotton Cloth Factories)

Act, 1929. The Notice of Accidents Act required notice of 'dangerous' occurrences, even though bodily injury has not been caused thereby, and in other respects strengthens the procedure as to notifying accidents. The Census of Production Act amended the Act of 1901 by allowing slight modifications in certain cases of the intervals of time for sending in return of persons employed. The Factory and Workshop Act of 1907 brought under the general provisions of the Act of 1901 all laundries that were not private house laundries. It also prescribed special regulations in regard to the use of stoves for heating irons, and fans for regulating temp. in laundries. The Act was applied with necessary modifications to charitable or reformatory institutions, not already subject to gov. inspection, where any manual labour was exercised in making, repairing, ornamenting, washing, or adapting for sale articles not intended for use in the institution itself. The Employment of Women Act, 1907, took away the exemption given by the Act of 1901 in respect of the period of time for employment of women in flax scutch mills, and thus brought that industry into conformity with the general provisions as to periods of employment. The White Phosphorus Matches Prohibition Act, 1908, prohibited the use of white or yellow phosphorus in the making of matches, and the sale or importation of matches so made. The provisions of the Truck Acts as to payment of wages in current coin will be found under TRUCK ACT. The Lead Processes Act of 1920 was an important measure for the protection of persons engaged in certain dangerous occupations where poisonous lead is used. Previous legislation dealing with this commodity had been limited to safeguarding the health of workers in lead-making factories and no provision was made for the safety of those who dealt with it as a completed article. The fact that lead is so widely used in manufacturing processes made further precautions necessary. The Act provided that all women and young persons employed in any processes where it was used should be medically examined at periodical intervals and also that there should be proper hygienic rules for its handling. The Factory (Workmen's Compensation) Act passed in 1923 placed the onus of responsibility for the workman's welfare more fully upon the employer than had hitherto been the case, and increased the amounts of compensation. The question as to what constituted a notifiable accident was decided by the rule that one which caused more than three days' absence from work came within that category. The Factories and Workshops (Cotton Cloth Factories) Act, 1929 (repealed and re-enacted by the Act of 1937) empowered the Secretary of State to strengthen the existing statutory regulations governing the use of artificial humidity, in accordance with the report of Jan. 23, 1928, of the Committee appointed by the Home Office in 1924 to inquire into the question. The Shops Act, 1913, makes special pro-

vision for the application of the principles of the Act of 1912 to refreshment houses and hotels, etc., which latter Act provides that no assistant may be employed for more than sixty-five hrs. a week exclusive of meal times, with provision for ann. holidays and twenty-six holidays on Sunday in every year. The Shops Act, 1928, provides the exact hrs. of Saturday employment with special exceptions in the case of holiday resorts, the sale of tobacco and perishable or urgently needed goods, such as medicines. There are also a number of other Acts incidentally affecting factory workers, such as the Shop

requirements for safety. It is evident that conditions in many factories when the Act was passed would have had to be completely changed before they could satisfy all the conditions laid down in the Act. Whether all factories during the stress and urgency of war-time requirements could comply with the regulations or whether they had had time before 1939 to effect the necessary changes, might seem doubtful; and again, in the difficulty after the war in obtaining building labour it would seem that the pre-1937 conditions must to an extent still prevail. In 1937 there were about



J. S. Fry and Sons, Ltd.

FACTORY AND SUNSHINE: SOMERDALE, BRISTOL
A modern factory for the manufacture of cocoa and chocolate.

Clubs Act, which makes it an offence in an employer to include under the conditions of employment a term that any workman shall discontinue his membership of any friendly society.

The Factories Act, 1937.—This Act reshaped and largely transformed the factory code. The Act and its concomitant regulations control in detail the conditions in which all factory work is done and, for women and young persons, the maximum number of hrs. that they may work on any day or in any week, and the maximum number of hrs. (overtime) in excess of the standard which they may work in any year. The Act controls the lighting of factories, their ventilation and temp.; it increases the amount of space to be allowed to each person; requires the provision of washing facilities, and is stricter in its requirement of the removal of dirt and workroom refuse; and requires floors to be cleaned at least once a week. There are also many new

167,000 factories and 73,000 workshops on the registers of the Factories Dept. of the Home Office. The Act of 1937 abolishes the distinctions in the then existing law between factories and workshops, and between textile and non-textile factories, and its provisions were made to apply to 'domestic' factories and workshops, which were previously under only limited regulation, and to 'men's' workshops in which no overcrowding restrictions had applied. In addition the Act reaches certain classes of premises which were theretofore outside the scope of the Factories Acts, such as making and mending fishing nets, the manuf. of furniture; and builders' yards.

As regards *hours of work*; the weekly hours to be worked by young persons under sixteen were reduced to forty-four, subject to the power of the home secretary to raise the hrs. to forty-eight provided certain strict conditions can be satisfied, as that a forty-eight-hr. week would

not be injurious to the health of the young people, and that their occupation is likely to lead to permanent employment in the industry. With these exceptions in favour of young persons under sixteen, the normal limit of working hrs. for women and young persons is altered to forty-eight a week as against the previous total of sixty (or fifty-five and a half in textile factories); there is a daily limit of nine working hrs. as against ten and a half (ten in textile factories), and a maximum 'period of employment' (i.e. the whole time from starting to finishing work including intervals for meals and rest) of eleven hrs. (as against twelve), and there must be no work after 1 p.m. on Saturday. Employment beyond forty-eight hrs. a week is not permitted for young persons under sixteen, but overtime employment beyond forty-eight hrs. is permitted for women and young persons over sixteen up to 100 hrs. in a calendar year. For women only the 100 hrs. may be increased to 150 in industries liable to seasonal pressure (previously employment beyond forty-eight hrs. a week was permissible in non-textile factories up to 624 hrs. in the year, and in certain industries subject to seasonal and other pressure, up to 669 hrs. for women and in the textile factories 390 hrs.) The permitted overtime is generally related to a factory or dept. of a factory (irrespective of the number of persons working) and not to individual workers: the proviso is that 'the overtime for the factory shall not exceed in the aggregate one hundred hours in any calendar year or six hours in any week and shall not take place in the factory in more than twenty-five weeks in any calendar year.' But to this general rule there is an exception which allows the home secretary in certain circumstances to permit overtime to be reckoned by reference to the individual. This exception is subject to a condition that no women may work more than seventy-five hrs. overtime and no young person more than fifty hrs. overtime in any calendar year. The home secretary also has power to reduce the overtime allowed for any industry if he is satisfied that this can be done without serious detriment to the industry. He may also prohibit or restrict the overtime employment of young persons in any process if he is satisfied that it would prejudice their health. There are also special exceptions in respect of laundries, blast furnace workers and milk and cheese factories. Certain occupations not formerly regulated as to hrs. are included in the scope of the Act, e.g. a young person whose work in a factory consists in delivering goods or running errands.

A young person on being taken into employment must be certified as fit for employment, i.e. the certificate must say that the young person is fit and not merely that he is not unfit.

The amount of space to be allowed for every person employed in a workroom is increased from 350 cu. ft. to 400 cu. ft. But this requirement was not immedi-

ately applied to then existing workrooms and, under certain conditions, exemption might continue for five or ten years. But notwithstanding this exemption the dist. inspector may require suitable mechanical ventilation in any case where he thinks it necessary on account of the particular circumstances, and if the ventilation is not provided as required, the exemption will cease to apply to the particular workroom. During the second period of five years effective and suitable mechanical ventilation must be provided in every case. After ten years the exemptions were to cease. This decennial period expired in July 1948.

A reasonable temperature is required in every workroom and the Act specifically provides that in rooms in which sedentary work of a light nature is carried on a temp. of not less than 60° must be maintained after the first hr. A thermometer must be placed in a suitable position in each room. Ventilation and lighting must be 'effective and suitable' and the Home Office may prescribe standards of lighting. Requirements as to the provision of sanitary accommodation are enforceable by the dist. councils, but the standard required is laid down in Home Office regulations.

The safety provisions are too numerous to describe in detail; but a large number of them are re-enactments of provisions in the Act of 1901 and subsequent legislation. A new and important requirement is the training and supervision of young persons working at dangerous machines, the net effect of the provisions being that the young person must have been fully instructed in the dangers and as to precautions to be observed; he must have been sufficiently trained in the use of the machine and he must be 'under adequate supervision by a person who has a thorough knowledge of the machine. Also in regard to transmission and other machinery, the cleaning of machinery by women and young persons, and hoists and lifts, the safety provisions are elaborated and strengthened by the Act. The previous law required every hoist and lift to be securely fenced. The new Act requires every hoist and lift to be of good mechanical construction, sound material and adequate strength and to be properly maintained; and it lays down detailed requirements as to fencing and other precautions in the interests of safety. New requirements are included to meet the case of new machinery; vessels containing dangerous liquids; chains, rope and lifting tackle; cranes and the like; construction of and maintenance of passages and stairs; safe means of access; security of ladders; precautions with respect to explosive or inflammable dust, gas, or vapour; steam receivers and steam containers; air receivers; and water-sealed gas holders. The requirements as to means of escape in case of fire are strengthened and extended. Every factory to which this section applies must have a certificate from the dist. council that the means of escape are adequate having regard to the circumstances of

the case.' Where the conditions are found to be so dangerous that the factory ought not to be used, an inspector may apply to a court of summary jurisdiction for an order prohibiting the use of the factory.

The duties of workpeople respecting safety appliances are laid down in a provision, which is novel in factory legislation, to the effect that they shall not interfere with or misuse any means, appliances, etc., provided for securing the health, safety, and welfare of the employees; and where any appliance for securing health and safety is supplied they shall use the appliance and not wilfully and without reasonable cause do anything likely to endanger themselves or others.

An underground room may not be used as a factory if certified by an inspector as unsuitable. New underground rooms must be notified before being taken into use, and the consent in writing of the inspector must be obtained if the room is to be used for any prescribed process of a hot, wet, or dusty nature or liable to give off fume. Underground bakehouses must be examined by the dist. council every five years.

The Act is essentially a codification of principles to which the regulations give a form that can, if necessary, be varied if industrial processes or conditions are altered. See Redgrave, *On Factory and Workshop Acts*; G. D. H. Cole, *Workshop Organization*, 1928; and the ann. reports of the Chief Inspector, pub. by H.M.S.O.

Labour problems received attention during the peace discussions at Versailles, and an International Labour Organisation was created by the Peace Treaty. This organisation was passed on to the League of Nations, under which it has done much useful work for the protection of operatives whose tasks involve special or unusual perils such as those from fumes, infection, dust, poisoning, strain, or accident. It also makes provision for instruction to be given on such medical and scientific points as should reduce or avoid risks.

Factory Inspectors, see **FACTORY LEGISLATION**.

Faculty: (1) A term formerly applied in philosophy to a fundamental function of the mind. Modern psychologists, however, regard the mind as a unity, not possessing faculties, but different activities. (2) In eccles. law, a F. is a dispensation or licence. *The Court of Faculties* is the court of the archbishop of Canterbury for granting certain dispensations, such as marrying without pub. of banns. This authority rested in the pope till the reign of Henry VIII. The sittings are held at 23 Knight-riding Street, Doctors' Commons. Its chief officer is called the master of faculties, and attached to the court are a registrar, deputy registrars, a record keeper, and a seal keeper. *A Grant of Faculty by the Ordinary* is given by the consistory court of the bishop of the diocese, and is necessary in order to effect any alterations in or additions to a church or parsonage. See R. Phillimore, *Ecclesiastical Law*, 1895. (3) The word

is also applied to a branch of learning. In this sense it is derived from Lat. *facultas*, which was used in medieval times to translate Gk. *δύναμις*. Thus, the faculties of medieval univs. were art, theology, medicine, and law. This use has since been further extended to include the body of members of a profession. Thus, in Scotland, certain groups of profs. are called 'faculties.'

Faed, John (1819-1902), Scottish painter, son of a millwright, b. in Kirkcudbright; was elected an A.R.S.A. in 1847 and R.S.A. in 1851; his paintings, such as 'The Cottar's Saturday Night,' are genre studies of humble Scottish life.

Faed, Thomas (1826-1900), Scottish painter, brother of John F., b. at Burley Mill. He was best as a painter of domestic genre, his pictures of this kind being 'Reading the Bible,' 'Mitherless Bairn,' 'The First Break in the Family,' 'Baith Faither and Mither,' etc. Consult W. D. McKay, *The Scottish School of Painting*, 1906.

Fæmund, see **FAMUND**.

Faenza, tn. of Italy, in the prov. or Ravenna, situated on the Lamone (anc. Anemo), 31 m. S.W. of Bologna. It is a beautiful city enclosed by old walls. In the Vittorio Emanuele Square, which is surrounded by arcades and ornamented with a beautiful marble fountain, is the cathedral of San Costanza, the church of San Michele, and the city hall, once the palace of Manfredi. The cathedral dates back to 1474, and contains some beautiful work by Benedetto de Majana, Innocenzo da Imola, and others. Majolica is manufactured and there are silk spinning and weaving works and sulphur refineries. New Zealand troops of the Eighth Army (q.v.) entered F. on Dec. 16, 1944. Owing to bitter Ger. resistance, prolonged over some weeks, the city and its monuments sustained severe damage, though the Cathedral escaped with a few slight shell-holes in the roof. The International Museum of Ceramics was destroyed and though, in 1940, most of the ceramics had been moved to deposits all these deposits were severely damaged, but much of the material under the ruins of the museum building was recovered. The public library was partially destroyed and 40,000 books were lost. Pop. 40,000.

Faerøe Islands (Dan. *Færøer*, sheep is.), group of is. belonging to Denmark, and situated in the N. Atlantic between the Shetland Islands and Iceland, 300 m. N.W. of the former. They number twenty-two, of which seventeen are inhabited. They almost all present a steep and precipitous coast seaward, the cliffs being 1000 to 2000 ft. high. The harbours do not afford a very safe anchorage, but they are washed by warm currents, and are always free from ice; the currents which run through the sounds are swift and dangerous, and storms and whirlwinds are very frequent. The surface is almost everywhere hilly, attaining to the height of 2502 ft. in Strömø and 2756 ft. in Osterø. All timber for building purposes is imported from Norway, as there are no trees in the islands, but the

rocks are covered with moss and ferns and the soil is rich in peat and coal. There is little cultivable soil, and only hay and potatoes can profitably be produced. The inhab. rely chiefly on the sea for their animal food. The ann. massacre of whales, schools of which are driven into the harbour of Thorshaven and there slaughtered, is an important event. The chief sources of wealth are fish (both fresh and dried), fish oil, and skins, wool, sea-bird feathers (especially loons). The largest is. are Strömö (28 m. by 8 m.), Osterö, Vaagö. Sandö, and

the Unionist Party. Area 540 sq. m. Pop. 29,100. See K. Williamson, *The Atlantic Islands*, 1948.

Faesi, K. Robert, Swiss poet and playwright, b. at Zürich. Prof. of Ger. literature in Zürich Univ. He is one of the few successful dramatists that Switzerland has produced. His tragedy *Odysseus und Nausikaa* (1911), his drama *Opferspiel* (1925), and his comedies *Die offenen Türen* and *Die Fassade* (1913) are of a quality unusual in the Swiss theatre and are his best plays. As literary historian, he has written on A. E. Frohlich, Paul Ernst,



FAEROE ISLANDS : KTVIVIK

Royal Danish Embassy

Söderö. The cap. and chief port of the group is Thorshaven in Strömö; Kirkebø on the same is. was formerly the seat of a bishop. The inhab. are almost exclusively of Norwegian descent, and speak an old Norse dialect, although Dan. is the language used in the law courts, churches, and schools. Since 1854 they have enjoyed a certain amount of self-government, electing a local assembly, but they send representatives to the Copenhagen chambers. Their religion is Lutheran. The F.I. were first colonised in the ninth century, and belonged to Norway until 1380, when they passed to Denmark. After the seizure of Denmark by the Gers. in April, 1940, Brit. troops occupied the F.I., but it was announced that they would be given back to Denmark after the war. In Sept. 1946, the people of the F.I. voted in favour of the is. separating from Denmark, and becoming a Republic. The plebiscite was the culmination of a struggle dating from 1906, when a Home Rule party was started in opposition to

Carl Spitteler, Rainer Maria Rilke, and K. F. Meyer; also *Gestalten und Wandlungen der Schweizer Dichtung* (*Forms and Changes in Swiss Poetry*), (1922). In 1928, received Swiss Schiller Prize for his collection of poems, *Der Brennende Busch*. Other poems *Aus der Brandung*, 1917, inspired by the 1914-18 war.

Fagan, James Bernard (1873-1933), dramatist; attended Trinity College, Oxford, and afterwards was on the stage (till 1899). He wrote *The Prayer of the Sword* (1904), and *The Earth* (1909); trans. *False Gods* and adapted *Bella Donna* (1911); but his most successful work was *And So To Bed* (1926) with the diarist, Pepys, as the chief character.

Fagging, a system prevalent in Eng. public schools by which a junior boy performs certain duties for a senior, such as running errands, stopping balls at cricket, tidying his study. The system was fully estab. at Eton and Winchester during the sixteenth century. The system usually has the full approval of the authorities.

The arguments in its favour are that it gives a certain amount of autonomy to the boys, and that it prevents bullying. It tends to make the younger boys helpful and willing, and devolves responsibility upon the elder boys, who are accountable for the good conduct of their fags and to protect them against bullying. A similar system known as *Pennalism* was introduced into the Ger. univs. during the seventeenth century, and is estab. in Amor. colleges, where it is known as *hazing*. School fagging was discussed at the Annual Conference of Educational Associations in January 1931, when the subject was brought forward by the Society for Experiment and Research in Education. The gravamen of criticism of the system was that there were better ways of teaching discipline and self-sacrifice, and that unless very carefully controlled and supervised, the system lent itself to cruelty and taught servility rather than service.

Faggot Votes, votes artificially created for party purposes, chiefly at co. elections, by transferring sufficient property to give a bare qualification for the franchise to persons who would otherwise be unable to vote. The transfer was made by nominal sale of property merely under mortgage. This practice was checked by Lord Somers's Act of 1896, and by the Representation of the People Act of 1884.

Faguet, Emile (1847-1916), Fr. critic and man of letters, b. at La Roche-sur-Yon. He was a master in schools at La Rochelle and Bordeaux, and in 1897 became a prof. at the univ. of Paris. Appointed a member of the French Academy in 1900. He was dramatic critic to the *Soleil* and literary critic to the *Revue bleue*. Among his works are *Histoire de la littérature française depuis le XVII^e siècle jusqu'à nos jours* (1900-01); and monographs on Flaubert (1899); Zola (1903); *Propos de théâtre* (1903-10), and *Histoire de la poésie française de la Renaissance au Romantisme* (1923-34). See A. Séché, *Emile Faguet*, 1904; also A. Belis, *La Critique à la fin du XIX^e siècle*, 1926.

Fagus, genus of Fagaceae to which also belong the sweet chestnut and the oak. In addition to *F. sylvatica*, or beech, the species native to Great Britain, there are about fifteen others, some of which have beautifully-tinted or sharply-toothed leaves and are well known in cultivation.

Faïore, grey copper ore of two varieties, *arsenical* and *antimonial*. The former occurs crystallised and massive, and consists chiefly of arsenic, copper, iron, and sulphur. The latter occurs crystallised in modified tetrahedrons, and consists chiefly of antimony, copper, iron, sulphur, and zinc.

Fahln, see **FALUN**.

Fahluite, or **Triklasite**, hydrous silicate of aluminium and iron, being an alteration product of the mineral *loilito*, due chiefly to its hydration. It usually occurs in regular hexagonal prisms, though its primary form is a right rhombic prism. Its colour is yellowish, greenish, and blackish-brown.

Fahrenheit Thermometer, see under **THERMOMETER** and **THERMOMETRY**.

Fahrenheit, Gabriel Daniel (1686-1736), Ger. physicist, b. at Dantzic. He lived in England and Holland, studying natural physics, and the manuf. of meteorological instruments. He invented certain improvements in the construction of thermometers, notably the use of quicksilver for alcohol, and devised the scale with freezing-point at 32°, boiling-point at 212°. He was elected a Fellow of the Royal Society of London (1724), and contributed papers to the *Philosophical Transactions*.

Faidherbe, Louis Léon César (1818-89), Fr. general, b. at Lille. In 1852 went to Senegal, of which he was appointed governor. The work he accomplished in Fr. W. Africa culminating in his defeat of El-Hadj Omar, is his most enduring memorial. Villard thus does justice to him: 'Il sut s'adapter et adapter toutes ses souffrances, il les sacrifia au sénégau et à son avenir. Il prit des mesures qui à coup sûr devaient détruire l'oeuvre présente mais faire naître de magnifiques remplacements...' Faidherbe vit grand, vit juste, dut son cher Sénégal au souffrir.' When he died he had just put the finishing touches to his book *Le Sénégal : La France dans l'Afrique Occidentale*. It is through Senegal that France plays a decisive part, political and moral, in W. Africa, and it was F.'s colonisation that really led to control over a vast continent. In the Franco-Ger. War, he commanded the N. Army. He withstood the attack near the R. Hallue, but was severely beaten at St. Quentin in 1871. When peace was signed, F. was sent by the Fr. Gov. to Egypt to study the monuments and inscriptions. His archaeological works include *Collection des inscriptions numidiques* (1870), *Épigraphie phénicienne* (1873), *Essai sur la langue poul* (1875). See lives by Fulcrand, 1890, by I. M. Brunel, 1897, and Villard, and also 'Faidherbe,' by Robert Delavignette in *Les Techniciens de la Colonisation* (ed. C. Julien) 1946.

Faidit, Gaucelm (c. 1160-c. 1215), celebrated Provençal troubadour, b. at Uzereche, Limousin. He was at first a *jongleur*, and wandered about with his wife, Guilhelma Monja, to the different European courts. In 1202 he accompanied Boniface III. of Montserrat to the crusades. Sev. of his songs are exhortations to the young and the strong to take part in the Holy War. Among his masters were Richard Cœur de Lion, whose death he lamented in a beautiful *planh*, Raymond d'Agoult, and Geoffrey of Brittany. Sev. songs and fragments of love lyrics are extant and are of great beauty. See R. Meyer, *Das Leben des Troubadours G. Faidit*, 1876.

Faience, or **Fayence**, general term applied to glazed earthenware, porcelain, and other kinds of pottery, and derived from the tn. Faenza in Italy, where it was first made.

Failsworth, tn. of Lancashire, England, 4 m. N.E. of Manchester. Its chief industry is cotton manuf. Pop. 17,600.

Fain, Agathon Jean François, Baron (1778-1837), Fr. historian, and secretary to Napoleon I., b. in Paris. A member of the Committee of Public Safety on the outbreak of the Revolution; then of the Directory and of the Consulate. Later he became archivist and secretary to Napoleon, whom he thereafter accompanied on all his campaigns, until the Emperor's abdication in 1814. Resumed his functions in 1815, but retired into private life on the return of Louis XVIII. In 1830 Louis Philippe made him first secretary of the Cabinet. His works on the military and diplomatic events of his time, including those of the Empire, are marked by accuracy and conscientious treatment, the years 1812, 1813, and 1814 being particularly well covered.

Fainéants, Rols, the 'Do-nothing Kings.' Nickname of the later Merovingians of France, namely Thierry III., Clovis III., Childbert III., Dagobert III., Childeric II., Thierry IV. and Childeric III. They were so called because during their regins the rule of the country virtually lay in the hands of the mayors of the palace.

Fainting, or **Syncope**, sudden loss of sensibility due to arrested circulation. The term is particularly applied to minor cases of shock where the condition of insensibility is transitory. The observable symptoms of F. are a sudden pallor of the face and loss of control over the muscles. The patient falls more or less suddenly and remains inert without any movement whatever. The eyes are half-closed or shut, the limbs are limp, the pulse is very weak or disappears altogether. It may be distinguished from epilepsy by the lack of movement and from catalepsy by the characteristic pallor. A feeling of faintness may not proceed as far as collapse; the patient feels dizzy, staggers for a moment, and suddenly recovers. The immediate cause of F. is an insufficient supply of blood in the brain. This may be brought about by actual loss of blood due to injury, or by poverty of blood due to a weakened condition, or may be preceded by a nervous disturbance. When F. is due to mental emotion, the medulla oblongata is over-stimulated to a condition of partial paralysis; the respiratory functions are sluggishly performed, the heart contracts feebly, and the circulation fails.

Treatment.—When assailed by a feeling of faintness, the patient should sit down and press the head downwards between the knees, when the flow of blood to the brain should be re-established. If the patient has already collapsed, he should be laid down with the head as low as possible and the respiratory functions stimulated by cold water on the face, by pungent aromatic vapours in the nostrils, by compressing and relaxing the ribs, etc.

Fair (Lat. *feriæ*, holidays), large mkt., held periodically. A fair was usually held on a holiday or a saint's feast to take advantage of the concourse of people. According to Cicero, the Gks. utilised the religious games for trading purposes, and the Romans, too, traded during the

ann. feast at the temple of Voltumna in Etruria. During the reign of Edward I. of England it was felt that the churchyards or immediate precincts of the churches and abbeys were being desecrated by Fs., and a law, embodied in the Statute of Winton, was passed to check the custom of holding Fs. near a place of worship. Courts of summary jurisdiction were formed to deal with any disputes or questions that might arise during a F., the date and duration of which had to be publicly made known beforehand. The traders who managed the F. were usually itinerant merchants, who went from place to place with their wares. At the time when means of communication were few, the F. was of great importance, but with the advance of civilisation is passing away. St. Bartholomew F. was held in London at Smithfield till 1855. Other famous Fs. were Stourbridge F. near Cambridge, which lasted for three weeks, Glasgow F. and Greenwich F. In England the F. has in many cases developed into a mkt. for live stock. One of the largest horse Fs. is held annually at Horncastle, in Lincolnshire; Exeter has a F. in Dec. for horses and cattle; Ipswich has one for lambs in Aug.; and Nottingham has an Oct. goose F. Some Fs., such as that of Gloucester, are famous for the agric. produce sold. In some country tns. such as Witney, the old-fashioned F. still remains. Fs. are still common on the Continent. Leipzig before the late war had three ann. Fs., each lasting three weeks, where leather, cloth, and furs were the chief commodities sold. Other Fs. of note were those of Frankfurt-on-Main and Frankfurt-on-the-Oder, Beaucatre in France, Bergamo in Italy, Debreczen in Hungary, and Corky in Russia. Siberia had Fs. at Klakhta and Irbit, and Arabia at Mecca. The F. has many points of similarity with the *melâ* of India. Consult Henry Morley's *History of the Fair of St. Bartholomew*, 1859; Cornelius Walford's *Fairs, Past and Present*, 1883; and *The Law relating to Markets and Fairs*, by Pease and Chitty, 1899. This term in the U.S.A. applies now solely to industrial exhibitions and what are known in England as fancy bazaars. In the former are included the 'state' and 'county fairs,' one of the first of which was the New York World's Fair opened in 1853 by a company formed in 1851 (see also under EXHIBITIONS).

Fairbairn, Andrew Mardin (1838-1912), Scottish theologian, b. near Edinburgh, and educated at Edinburgh and Berlin Univs. In 1877 he was appointed principal of the Alredale Congregational College, Bradford, a post which he gave up in 1886 on receiving a similar appointment at Mansfield College, Oxford. Author of *Studies in the Philosophy of Religion and History* (1876), *Studies in the Life of Christ* (1881), *Christianity in the First and Nineteenth Centuries* (1883), *The City of God* (1883), *Religion in History and in Modern Life* (1884), *Christ in Modern Theology* (1893), *Philosophy of the Christian Religion* (1902), and *Studies in Religion and Theology* (1909).

Fairbairn, Sir William (1798-1874), Scottish civil engineer, b. at Kelso, in Roxburghshire. In 1804 he began his apprenticeship at the Percy Main Colliery, N. Shields, where he became a friend of George Stephenson. In 1817 he began a business of his own in Manchester, entering into a partnership with James Lillie, which lasted till 1832. He introduced improvements in mill works and water wheels, substituting iron for wood in the shafting. He was one of the first to build iron ships, which he floated on the Forth and Clyde Canal. In 1835 he estab. shipbuilding works at Millwall, London, and was consulted by the Brit. Association on the supposed defects in iron caused by hot-blast furnaces. He carried out the construction of the tubular bridge across the Menai Strait, designed by Robert Stephenson, and himself invented the rectangular structures of the Britannia and Conway bridges. He wrote extensively on engineering subjects. See lives by W. Pole, 1877, and S. Smiles (in *Lives of the Engineers*), 1861.

Fairbanks, Douglas (1883-1939), Amer. cinema actor (real name Douglas Ullman); b. May 23, at Denver, Colorado. He was educated at Jarvis Military Academy, Denver, E. Denver High School, Colorado School of Mines, and Harvard Univ. He then took to the stage, under the tragedian Frederick Warde—his first part being François the lackey in *Richelieu*. After a period of Shakespeare, in whose plays F. did not shine, he joined the company of Herbert Kelcey and Effie Shannon. He next became a clerk in a broker's office in Wall Street. After that, he and two acquaintances went as 'hay-stewards' in a cattle-boat to Liverpool—tramped through England, France, and Belgium, working at odd jobs, for three months—then returned to America. For a little while he was in a machine-shop; next, rambling in Cuba and Yucatan. When he returned to the States, he took up acting again. His first appearance on the New York stage was in 1901. He starred in *Man of the Hour* and *The Gentleman from Mississippi*. Married Anna Beth Sully, of Providence, Rhode Island in 1907. After 1915 confined himself to the films such plays as: *The Half-Breed*, *The Habit of Happiness*, *The Good Bad Man*, *Reggie Mizes in*, *The Mystery of the Leaping Fish*, and *Manhattan Madness*. In 1917 he owned his own producing company. His outstanding pictures include: *The Mark of Zorro*, *The Three Musketeers*, *Robin Hood*, *The Thief of Bagdad*, *Don Q*, and *The Black Pirate*. Divorced, 1918. Married, secondly, March 28, 1920, the film-actress Mary Pickford (who obtained a divorce, 1935).

Fairbury, co. seat of Jefferson co., Nebraska, U.S.A., 67 m. S.W. of Lincoln, and centre of a farming co. with various industries. Pop. 6300.

Fairfax, Edward (c. 1580-1635), Eng. writer, b. at Denton in Yorkshire. His reputation rests on his trans. of Tasso's *Gerusalemme Liberata*, pub. in 1600 under the title of *Godfrey of Bullioigne, or the Recoverie of Jerusalem, done into English*

Heroical Verse. His poem has great beauty; Dryden compared him as a poet with Spenser, and Waller acknowledged that he owed to him the harmony of his numbers. He also wrote eclogues, one of which appeared in Mrs. Cooper's *Muses' Library* (1737) and a *Discourse on Witchcraft*, pub. by Monckton Milnes in the *Miscellaneous* of the Philobiblon Society, 1621.

Fairfax, Sir Henry (1837-1900), Brit. admiral. He distinguished himself as a lieutenant on the *Ariel* in suppressing the slave traffic of the E. coast of Africa, and in 1872 acted as naval attaché to Sir Bartle Frere in an expedition to the sultan of Zanzibar. In 1877 he was appointed to the command of the *Britannia*, when he personally superintended the studies of Prince Albert Victor and King George V. He was in command of the *Monarch* at the bombardment of Alexandria (1882).

Fairfax, of Cameron, Ferdinando, second Baron (1584-1648), Eng. general of the Parl. forces, son of Thomas F., first baron, of Denton, Yorkshire. His name is associated chiefly with the conflict in Yorkshire. When the king left the Parliament and estab. his quarters at York, the Commons sent F. to report on the king's movements, and F., by protesting against the presentment of the grand jury of Yorkshire, received the thanks of Parliament. He commanded the forces in Yorkshire, but was severely defeated at Adwalton Moor; later he turned the tables on the Royalists at Selby and again at Pontefract. See Sir C. R. Markham, *Life of the Great Lord Fairfax* (i.e. the third Lord F.), 1870.

Fairfax, Thomas, third Baron Fairfax of Cameron, son of Ferdinando (1612-71), second Lord F., was b. at Denton, Yorkshire. Went to St. John's College, Cambridge, where he matriculated. Fought in the siege of Bois-de-due (1629), and later in the first Scottish War, but it is as a general for the parliament during the Civil War that he is best remembered. He captured Leeds and Wakefield in 1643, and in the following year had a command at Marston Moor. In 1645 he was appointed commander-in-chief of the parl. army, and in that year defeated Charles I. at the battle of Naseby. He was one of the king's judges in 1649, and was opposed to his execution. He was a man of great courage and a brilliant general. See *The Great Lord Fairfax*, 1870, which also contains a list of pamphlets relating to his campaigns. See also the *Maseres Papers*.

Fairfield, par. and vil. of Derbyshire, England, adjoining Buxton. Pop. 6700.

Fairfield, city of Jefferson, co. Alabama, U.S.A., 5 m. W. of Birmingham, an industrial suburb of B. founded in 1910 to provide for the employees of the U.S.A. Steel Corporation. Pop. 11,700.

Fairfield, city of S.E. Iowa, with important manufs., the site of Parson's College (Presbyterian). An ann. Chautauque assembly is held here. Pop. 6700.

Fairford, vil. of Gloucestershire, England, on the Colne at the foot of the Cotswold Hills, 9 m. E. of Cirencester. It is

noted for its old church in the Perpendicular style, built by John Tame in the fifteenth century. It has fine stained-glass windows of Flemish workmanship. See J. G. Joyce, *The Fairford Windows*, 1872. Pop. 1800.

Fairhaven, tn. of Bristol co., Massachusetts, U.S.A., situated at the mouth of the Acushnet R., on Buzzard's Bay, opposite New Bedford. It has manufs., a good harbour, some fine public buildings, and is a summer resort. Pop. 10,900.

Fairhead, or **Benmore Head**, promontory on the N. coast of Ireland, co. Antrim, 5 m. N.E. of Ballycastle. It is of columnar basaltic rock, 636 ft. high.

Fairies and Elves (Fr. *fée*; Low Lat. *fata*, from *fatāre*, to enchant; Lat. *fatum*, fate; O.E. *alf*; Dan. *alf*; Icelandic, *alfr*), supernatural beings existing in the mythology and folklore of all nations. They have often been represented as tiny, winged sprites, sometimes malignant, sometimes benign, who possess a mysterious power over human destinies. They need not, however, be diminutive beings, and have often appeared in the shape of humans. The fairies of Teutonic and Celtic lore probably owe much to the sirens, nymphs, and fauns of classical mythology.

They have often taken the form of a beautiful woman who has beguiled men by her charms. Such were the Sicilian Sirens, whose singing on the rock near Cape Pelorus had such a fatal attraction for all seafarers until Ulysses, by an artifice, sailed safely past them, whereupon they drowned themselves in the sea. There are fairy lemans in Homer, elf-maidens in Scandinavian literature, and R. L. Stevenson, in *Island Nights' Entertainments*, says that they are not uncommon in Samoa. A striking description of the elf-woman, who has pale kings and princes and warriors in thrall, occurs in Keats's ballad, *Lg Belle Dame sans Merci*. Fairies are soulless beings, but by marriage with a man may attain immortality. Fouqué made use of this superstition in his story of the water-nymph, Undine. When fairies have left their own country to marry and live with men, they have generally been bound by some restriction, which, when disregarded, brought great misery. Melusine built a great castle for her husband, and lived for many years in happiness. Once a week, however, she became a serpent from waist to feet, and the condition was that her husband should never see her when she was thus transformed. But he surprised her one day in her bath, and with a shriek she vanished for ever from his side, only appearing from time to time as a warning of approaching death in his family. According to another superstition, fairies have to pay a yearly tribute to the powers of hell, and for this purpose they are always trying to steal little children, leaving changelings in their place. The peasants of Ireland still fear for their children, and never dare to speak of the little people as otherwise than 'good,' lest they should take offence and revenge themselves by robbing the cradles. Adults,

too, have sometimes been allured to fairyland. They are then undone, and can seldom return from that country. Kirk (d. 1692), the author of *The Secret Commonwealth of Elves, Fauns, and Fairies*, it is said, was carried off by fairies. He appeared, however, to a friend, and said that on his next visit, if the friend threw a dagger over his shoulder, the enchantment would be broken. The friend failed him, and Kirk has never again been seen by mortal men. In the old ballad, Janet really effected the escape of Tamlane from fairyland. A human being is undone if he eats fairy food, and Falstaff, it will be remembered, dared not speak to fairies or be a witness of their doings: 'He that speaks to them shall die; I'll wink and couch: no man their works must eye.' Fairies can be very malicious—Falstaff was pinched by his friends disguised as fairies and hobgoblins. This is the ordinary practice of elfish creatures, and thus Lyly in his *Endymion* has Corsetes pinched black and blue by fairies. There always have been good and bad fairies. As in the old nursery fairy tale of the *Sleeping Beauty*, so at the birth of Ogier le Danols six fairies were present, five of whom gave good gifts, but the sixth was a bad fairy. In England, the fairy has been, in general, a domestic spirit, who visits houses at nights, sweeps the floor, threshes the corn, or skims the milk: but 'crofuld out of doors he flings, ere the first cock his matin rings.' The Ger. fairy is equally helpful, and is called *Kobold*, a goblin. Belief in fairies has, however, diminished in England, but the country people of Cornwall are still persuaded of the existence of pixies, who, they say, are really the lost souls of babies who have died before baptism. (See F. Hitchens' *History of Cornwall*, p. 97, 1824). Considerable interest has been aroused of late years in Celtic fairy legends through the writings of Andrew Lang, W. B. Yeats, Ernest Rhys, and others. Irish fairies dwell in crevasses and underneath old tumuli, in some ways the Irish leprechaun thus resembling the black earth elves of Scandinavia, who burrowed underground dwellings, where they retreated with stolen treasure. Scottish fairies, brownies, kelpies, and the like are supposed to be more malignant than their Irish brethren, and are creatures of storms and tempests.

Consult L. F. Maury, *Les Fées du Moyen Age*, 1843; T. Keightley, *Fairy Mythology*, 1850 (new ed. 1910); W. Sikes, *British Goblins*, 1879; J. Grimm, *Deutsche Mythologie* (Eng. trans.), 1880-88; T. Gorer, *Fairy Legends of Ireland*, 1882; W. B. Yeats, *Celtic Twilight*, 1883, 1902; and *Fairy and Folk Tales of the Irish Peasantry*, 1888; W. Camble, *Scandinavian Folk-lore*, 1896; Sir J. Rhys, *Celtic Folk-lore*, 1901; R. Hunt, *Popular Romances of the West of England*, 1923; G. Willoughby-Moade, *Chinese Ghouls and Goblins*, 1923; M. W. Latham, *Elia-bethan Fairies*, 1930; J. MacCulloch, *Were Fairies an Earlier Race of Men?*, 1932; L. Spence, *The Minor Tradition of British Mythology*, 1948.

Fair Isle (Norse *faar*, a shire), a small isolated is. of the Shetlands, Scotland, situated between the latter group and the Orkneys, 24 m. S.W. of Sumburgh Head. It has an area of 6 sq. m., its sandstone cliffs are high and rocky and it has an extremely indented coastline. The industries are fishing and knitted articles. The Moorish patterns of the hosiery and other garments made here are believed to have come through the wrecked crew of one of the Armada vessels in 1588. The is. is a stepping stone in the migratory movements of birds on the wing each autumn and spring to and from Britain, and research into the origins, routes, wintering areas, feeding habits, etc. of the myriad migrators has been estab. there. Pop. 80.

Fairlie, vil. of N. Ayrshire, Scotland, situated on the E. shore of the firth of Clyde, 2½ m. from Largs. It is noted for yacht-building. Pop. 1400.

Fair Maid of Kent, Joan, daughter of Edmund, earl of Kent, granddaughter of Edward I.; so called on account of her beauty. Eventually wife of the Black Prince.

Fair Maid of Norway (1283-90). Margaret, daughter of Eric II. of Norway, and granddaughter of Alexander III. of Scotland; died on her way from Christiania to succeed Alexander on the Scottish throne, an event which gave rise to a struggle for the crown by rival claimants.

Fairmont, tn. of W. Virginia, U.S.A., and the cap. of Marion co. It is situated on the Monongahela, 55 m. S.E. of Wheeling, at an important railway junction. It ships great quantities of coal and manuf. glass, textiles, etc. Pop. 23,100.

Fair Oaks, or Seven Pines, railway station of Virginia, U.S.A., situated 7 m. E. of Richmond. It is noted as the scene of a battle, in 1862, of the Civil war, when the Union forces under McClellan gained a victory over the Confederates under Johnston. The former lost 5031 men, while the latter lost 6134.

Fair Rosamond, Rosamond Clifford, the mistress of Henry II. of England. Popular legend has it that she was held in a secret tower at Woodstock, in the heart of a labyrinth which only the king could thread.

Fairy Rings, bare or green circles in pastures or meadow lands which were once thought to be the scene of the midnight revels of fairies. But sceptics in fairy lore have long been armed with a rational and scientific explanation of the phenomenon. The rings are caused by the growth of the subterranean mycelium of fungi, which radiate outward to find fresh soil and nourishment. The circles are bare because the *Agaricus campestris* (common mushroom), or *Marasimus oreades* (the F. R. champignon), has exhausted the fertility of the earth, so that grass cannot grow, but as soon as the fungi begin to decay the ground becomes refertilised by the rich nitrogenous products of putrefaction and the grass grows greener than ever.

Faisal, King of Iraq, see **FKISAL**.

Faisans, *lie des*, or *l'isle de la Conterence*, is. with many historical associa-

tions in the R. Bidassoa, which is on the frontier between France and Spain. Here in 1659 was concluded the 'Peace of the Pyrenees' between Mazarin and D. Luis de Haro.

Faith is the acceptance of truth on the authority of another who reveals it (actual F.) or that quality or spiritual vision of the soul which enables it to transcend the confines of the visible and actual and to realise the eternal truth of all the unfathomable mysteries of God. In the Epistle to the Hebs., it is defined as 'the substance of things hoped for, the evidence of things not seen,' and in Christian theology is regarded as the gift of the Almighty, without which there can be no salvation.

But though the meaning of F. is clear in the abstract, and F. is a force of universal recognition, yet it cannot be expressed or comprised in any formal definition, so that the varying interpretations given to it from time to time must be regarded as diverse, but not conflicting, manifestations of a single and fundamental spiritual vision or capacity. Some regard faith as that divine strength in a man's soul, which wins for him the essential gift of God's grace, whilst others conceive of it as that instinctive and unwavering conviction that the supreme goodness of the Saviour is strong enough to wash away all his impurity and sin. Sometimes, as in the works of Thomas Aquinas, an antithesis is implied between F. and reason, that is between knowledge accepted or credible (divine) authority or deduced from sensible evidence. In not a few Calvinistic churches and stern religious brotherhoods, such as that of the Plymouth Brethren, divine law is deemed an arbitrary expression of God's will, the observance of which is demanded from all believers, even though it appeal to their blind but passionate F. rather than to their reason. A gentler conception is that the reasonableness of the Divine Will is inscrutable, and that a Christian must never lose F. in its ultimate justice in spite of the calamities which overtake many a Job of this world, and in spite of the many other anomalies which seem to belie this belief.

A classification of the different forms or aspects of F. is sometimes attempted. F. is called human or divine according as it is based on man's or God's authority. Habitual F. adheres permanently to the soul; actual F. is the inception or exercise of habitual F. F. is explicit if its object is clearly perceived by the believer's mind; implicit, if it is only known generically and *in globo*.

Faithfull, Emily (1835-96), Eng. philanthropist, devoted her life to the improvement of the status, remuneration, and sphere of labour of working women. In 1860 she started the *Victoria Press*, in which the printing was in the hands of women, and from 1863 to 1881 she continued to publish the *Victoria Magazine*, and to plead in its columns for greater equality between the sexes. Her lectures, both in Great Britain and the States, revealed to the public her noble

aims and the disinterested nature of her work.

Faith-healing is a mind cure, resting on the firm conviction that, as suggested in James v. 14, pain and disease may be dispelled without medical aid, a lively faith in Divine Power being the one *sine qua non*. The miraculous recoveries which took place in the temples of the Gk. god, Æsculapius, no less than those effected by the king's touch all through the Middle Ages, must be regarded as instances of F. So also may be regarded some of the cures brought about by belief in the efficacy of relics, shrines and holy places such as Lourdes, the tombs of the saints and St. Winifred's Well in Flintshire, and perhaps even some of the miraculous cures worked by Christ and His apostles. The Waldenses, Moravians, and the Peculiar People of a later date all trusted to prayer and anointment with oil for the relief of sickness, whilst faith cures were an integral part of the beliefs of Pietists, and many sects of Puritans and Methodists, as well as afterwards of the Irvingites and Mormons. Professor Blumhardt and Dorothy Trudel conceived of healing rather in the sense of the medicine men of savage tribes, that is, as the expulsion from the body of an evil and tormenting spirit, whilst modern Christian Scientists go so far as altogether to deny the existence of physical suffering and disease. (See CHRISTIAN SCIENCE.) Psychologists attribute so-called cures by faith to powers of suggestion which are peculiarly developed in any assemblage where the nervous and emotional activity is high. In Jan. 1931 the Lower House of Convocation of Canterbury passed a resolution in favour of Spiritual healing. The resolution petitioned the Archbishop of Canterbury to appoint a joint committee to draw up a provisional service for Unction (anointing the sick with oil) and Imposition of Hands for temporary use until a permanent and fully authorised form could be issued under Synodical sanction. See E. R. Mickleth, *Miracles and New Psychology*, 1922; C. H. Brooks, *Practice of Auto-suggestion by the Method of E. Coué*, 1922; J. M. Hickson, *Heal the Sick*, 1924; G. G. Dawson, *Healing; Pagan and Christian*, 1935.

Faithorne, William (1626-91), Eng. painter and engraver, born in London. He was imprisoned as a Royalist in the Civil war, and when released he went to France. Returned to England about 1650 and carried on work as an engraver and printseller. His engraved portraits include those of Oliver Cromwell and Charles I. F. wrote *The Art of Graving and Etching* (1682).

Faiyûm, fertile prov. of Upper Egypt, lying W. of the Nile, a little above the head of the delta, and 65 m. from Cairo. Geographically it is a S. oasis in the Libyan desert, irrigated by means of a canal (or Bahr-Yusuf) running through a narrow gorge to the Nile valley. Its area is about 670 sq. m., a portion of which is occupied by a sheet of water, the Birket-el-Karun (35 m. long), known to the ancients as Lake Moeris, by the shores of which

stood one of the wonders of the world, the famous 'Labyrinth.' The chief crops are cereals and cotton, but the prov. is also noted for its figs and grapes. Olives, too, and rose trees, from which the inhalemanuf. attar of roses, are grown. Other productions are sugar, flax, hemp, oranges, peaches, and pomegranates, and F. also has a good breed of sheep. The cap. is Medinet-el-Faiyûm, which is a



Canadian Pacific
AN INDIAN FAKIR

great agric. centre. Important explorations have been made by Flinders Petrie at the sites of anct. cities in this prov. Dr. Johnson, Librarian of Oxford Univ., has also made interesting discoveries of papyrus rolls in excavated tombs in this region in the years immediately preceding the First World War. Pop. (prov.) 671,800; (tn.) 72,400. See R. H. Brown, *Faiyûm and Lake Moeris*, 1892; P. Viereck, *Faiyûm*, 1928.

Faizabad, or **Fyzabad**: (1) Cap. of the Muslim ter. of Badakhshan, Afghanistan, on the Koksha R., 87 m. E.N.E. of Kunduz, and N. of the Hindu Kush. Murad Beg deported all its citizens to Kunduz in

1821 and razed the tn., but it is now once more a flourishing entrepôt for Afghanistan and the Pamir. See also **BADAKSHAN**. (2) City in the United Provs. of India. Ajodhya, once a city of great native splendour, is now a suburb. The Mausoleum of the Bahu Begum is the finest in Oude. It is 140 ft. high. Bahu Begum was one of the two Begums of Oude whose alleged ill-treatment was a subject of indictment of Warren Hastings. Ajodhya is one of the seven sacred Hindu shrines. The Janam St. han Temple is 200 by 150 ft., with walls 45 ft. high; $\frac{1}{2}$ m. to the N. is Ram Ghat, where Rama was cremated. F. is the headquarters of a dist. and of a div. Once the cap. of Oude, it has fallen into decay since the death in 1816 of Bahu Begum, who resided here for many years. Pop. 60,000.

Fajardo, tn. and dist. on the E. coast of Puerto Rico. There are sugar plantations and orange groves in the fertile 'environs,' whilst the tn. itself is a busy entrepôt. Pop. (tn.) 7000, (dist.) 16,000.

Fakenham, tn. 20 m. W.S.W. of Cromer, Norfolk, England. It has an important corn market and a fourteenth-century church. Pop. 2800.

Faking, see **FORGERY IN ART**.

Fakirs (from Arabic *fakir*, poor), are usually called dervishes in Persia, Turkey, and Egypt, dervish meaning 'a religious Mussulman beggar.' The Fs. of India are properly Hindu ascetics, who belong to strict religious orders, but the term F. is also applied to wandering charlatans, who profit by the villagers' superstitions to gain nefarious livelihoods. See **DERVISHES**.

'**Falaba**,' S.S., a liner of over 4000 tons belonging to the Elder Dempster Company. During the First World War, when on her way to Sierra Leone, she was torpedoed by a Ger. submarine off the S. coast of Ireland on March 27, 1915. She received only the briefest warning, and sank within a few minutes, with the loss of over one hundred lives. Indignation in America was widespread over this outrage, which, however, was eclipsed on May 7, 1915, by the sinking of the S.S. *Lusitania*. Both incidents were direct contributory causes to the entry of the U.S.A. into the War.

Falaise, tn. 22 m. S.S.E. of Caen, in the dept. of Calvados, N.W. France. It is on the Ante, and is the cap. of an arron. There are cotton yarn and hosiery manufs. and tanning is carried on, but the tn. is famous for its castle, where Wm. the Conqueror was born. It is a square structure crowning a high rock, and dates mostly from the twelfth century. A famous fair is held annually in the suburb of Guibray, which lies due E. Pop. 5600.

Battle of the 'Falaise Pocket.'—The name given to the Ger. débacle on the W. Front, Aug. 12-22, 1944. The Gers., under the supreme command of Marshal Rommel, had hoped to drive to Avranches when they began their attack of Aug. 7 with a formidable armoured force of four Panzer divs., elements of a Panzer Grenadier div. and supporting infantry, which they had concentrated in the

Mortain area. With this force Rommel counted on thwarting the further advance of the Allies in Normandy. Rocket-firing Typhoons dived on the spearhead of the Ger. armoured columns and destroyed or damaged many tanks. In spite of these checks the Gers. persisted and the battle continued for many days. It was not until Aug. 12 that the first signs became evident that the Gers. had resigned themselves to the impossibility of attaining their objective and at last contemplated withdrawal. But they had clung too long to a position from which military wisdom would have suggested a much earlier retreat. Two days previously the Allied



W. F. Mansell

FALAISE CASTLE

The birthplace of William the Conqueror.

Command had decided to seize the opportunity for encirclement offered by the unsound tactics of the Gers. With Amer. Third Army forces at Argentan and the Canadians at Falaise, the stage was set for the 'Battle of the Pocket,' with the Gers. struggling desperately to keep open the gap between the two tns.—Mortain and Argentan—from which to extricate their forces from the W. By Aug. 13 the withdrawal from Mortain eastward was under way. Infantry reinforcements were now hurriedly brought back from across the Seine—five divs. crossing during the week preceding Aug. 12; but it was too late now for them to be able to save the situation. In the pocket, the Ger. strategy was to line the S. lip through Argentan with their armour as a defence against the Amer. forces while they extricated what they could of their forces through the gap, and, at the same time, to oppose against the Canadians a strong defensive barrier of two Panzer divs. at Falaise. By this means, resisting fiercely, the Gers. succeeded in holding open the jaws of the Allied pincers long enough to enable a proportion of their forces to

escape. As usual, the Gers. concentrated on saving their armour and left the bulk of the infantry to its fate. A considerable part of the half-dozen or more Panzer divs. managed thus to get away but some seven infantry divs. and part of an eighth, together with some of the 10th and 21st Panzer Divs. were trapped. Until Aug. 17 there was a steady seep eastward through the gap, but then came a convulsive surge to get out on the part of all ranks, and the orderliness with which the retreat had hitherto been carried out collapsed suddenly. All now became chaos and confusion as the remaining forces in the pocket struggled to get out through the diminishing corridor by Trun, which was all that remained of the escape route. Allied Air Forces now swept down on the choked mass of transport and there was no sign of the Luftwaffe offering any opposition. The consequent destruction assumed immense proportions as the Allied aircraft and artillery combined in pounding the trapped Gers. By Aug. 20 the gap was finally closed near Chambois and by the 22nd the pocket was eliminated. The lovely wooded countryside W. of Argentan had become the graveyard of the army which, three months earlier, had confidently waited to smash the Allied invasion on the Normandy beaches. (See Gen. Eisenhower's Report to the Combined Chiefs of Staff, H.M.S.O., 1946. See also WESTERN FRONT IN SECOND WORLD WAR: BATTLE OF NORMANDY.)

Falangists, Sp. Fascists, who co-operated with Gen. Franco in the Sp. Civil war, 1936-39. Their tendency towards social radicalism brought them up against the Conservative military caste and they were repressed in 1938. Franco, however, assumed the leadership of the F. and they were soon the only political organisation tolerated in Spain. Their former leader, Antonio Primo de Rivera, son of the one-time Sp. dictator, was shot by the Republicans. The F. were undoubtedly under Ger. and It. influence during the Civil war.

Falashes (from Ethiopic *falas*, a stranger), tribe of Hamitic stock and Jewish religion, who are subject to the kingdom of Tigré in Abyssinia. They speak Ethiopic (or Ge'ez), and their O.T. and other sacred books are written in this language, not in Heb. Though their religion is infected with pagan beliefs, such as faith in the potency of the evil eye, they practise a higher morality than their Christian rulers. Unlike their co-religionists, they live by agric., not by commerce. Until 1800 they had their own king, and are remarkable for their voluntary segregation from other tribes or sects.

Falco, Gian, see PAPINI, GIOVANNI.

Falcon, most northerly state in Venezuela, bounded N. and W. respectively by the Caribbean Sea and the gulf of Venezuela (also by Zulia), and southward by the state of Lara. Tropical bogs and sandy levee's line the coast. Inland trade passes through Coro, the cap., the one seaport being La Vela de Coro. Pop. 232,600.

Falcon (Lat. *falco*, Teut. *valken*), a name given to certain members of the Falconidae (q.v.) a family of birds of prey which catch their quarry on the wing. They have short curved beaks with one notch in the upper mandible; the wings are long and pointed, and the toes elongated. *Falco candicans*, the Greenland F., is white in colour, and is sometimes called the white gerfalcon; *Hierofalco*, the gerfalcon, is singular in having plumage of a slaty grey; *F. gyrfalco*, the Scandinavian F., and *F. islandicus*, the Iceland F., migrate southward in winter, the latter occasionally reaching Britain; *F. peregrinus*, which, together with the northern F. and other species, is used in falconry, ranges over Europe, China, Japan, N.E. Africa, and N.W. India. This species is known in England as a migrant, and is found nesting on lofty cliffs; it is amazingly swift in flight and devours game and birds of all kinds. See also FALCONRY.

Falcone, Aniello (1860-65), It. battle painter, is the most famous of Ribera's pupils, and himself the founder of a school. In his battle-scenes, taken both from biblical and secular stories, he shows himself a careful painter, capable of suggesting some of nature's animation. During Masaniello's revolt (1647), he organised his pupils into the 'Compagnia della Morte' (company of death), and paraded the streets by night to murder Spaniards. F. wisely went into exile on the restoration of peace.

Falconer, Hugh (1808-65), Brit. botanist and paleontologist. During his first stay in India (1830-42), he was superintendent of the botanic garden at Saharanpur, and during his second (1847-55), held a similar post at Calcutta. He discovered the *asafetida* medicinal plant in India, and urged the cultivation there of tea and the cinchona bark. During his invaluable geological researches in the tertiary deposits of the Siwalik hills he made a splendid find of fossils including the Mastodon and an enormous pre-historic tortoise. His *Fauna Antiqua Sivalensis* (1846-9) was never finished. He is justly regarded as a martyr to science, for overwork undoubtedly undermined his health.

Falconer, Sir Robert Alexander (1867-1943), Canadian clergyman and educationist, b. at Charlottetown, Prince Edward Island, Canada, son of Dr. A. Falconer, clergyman. Educated at Queen's Royal College, Trinidad and at London and Edinburgh Univs. Also studied at Berlin, Leipzig and Marburg. Ordained Presbyterian minister, 1892. Taught N.T. Gk. at Pine Hill Presbyterian College, Halifax, from 1892-1907, and was Principal there from 1904-07. Appointed President of the Univ. of Toronto at the age of 40, being there from 1907-1932. Under his guidance the univ. was organised into a highly efficient whole. In 1925 in England he gave the Sir George Watson Lectures on Amer. Hist. President of the Royal Society of Canada and of the Royal Canadian Institute.

Falconer, William (1738-69), Scottish poet, belonged to a large family, all of whom were deaf and dumb except himself.

His famous *Shipwreck*, first pub. in 1762, was based on a personal experience, for he was one of the few survivors of a merchant vessel which foundered off Cape Colonna, Greece. In spite of the somewhat offensive mixture of the artificial, elegant style of Pope with the breezy, technical dialect of a sailor, the life and vivid descriptive passages of the poem are ample excuse for its popularity. In 1764 he directed a rhymed lampoon, 'The Demagogue,' against Wilkes and Churchill and in 1769 pub. his *Marine Dictionary*.

Falconet, name given to a small field gun introduced in the fifteenth century. With culverins, sakers, and demi-cannons, etc., falcons formed the lighter ordnance up to the eighteenth century.

Falconet, Etienne Maurice (1716-91), Fr. sculptor, b. at Paris, spent twelve years in St. Petersburg (1766-78), where he executed for Catherine II. a colossal statue in bronze of Peter the Great, which stands in the square of the senate. He held the anct. sculptors in small esteem, which perhaps accounts for the somewhat meretricious taste apparent in even his fine 'Milo of Crotona.'

Falconidae, family of diurnal birds of prey, comprising the falcons, hawks, kites, buzzards, eagles, etc., and constituting, with the vultures the typical Accipitrines. The head is crowned with feathers, and the female is larger than the male; the two sexes associate in pairs and mate for life.

Falconry (from O.F. *fauconnerie*), the art of training falcons and hawks for the chase. Hawking is commonly regarded as a synonym, but is properly restricted to the practice of F. in the field. Its antiquity is an estab. fact, but no one knows where or when this 'aerial warfare' was first introduced. There are records proving its early popularity in Asia Minor, Turkey, Persia, Tartary, and China, and it is interesting to read Marco Polo's almost incredible yet undoubtedly veracious account of how Kublai Khan, the great Emperor of Tartary and China, went hawking in the thirteenth century. Pennant has suggested Scythia as the birthplace of F., arguing that thence it spread all over N. Europe and especially to Norway, where falconers attained such remarkable proficiency. In India the art seems to have been practised from time immemorial, the hawks being trained to the boldest flights, to stoop at the antelope and wild boar, besides at the gazelle and the stag. Here, moreover, as in the E. generally, these birds are still used for hunting, and the native Indian gentry still train their largest falcons 'to kill deer by pitching on their heads and picking out their eyes.' To turn to Europe, it is written how even in the eighth century the 'grand fauconnier' in France was 'an officer of great eminence,' with an ann. salary of 4000 florins, and as many as 300 hawks. In England, the early Britons of the days of the Rom. occupation were skilled in F., whilst among the Saxons there is mention of it in the reign of Ethelbert (760). King Alfred is commended as a falconer, and from the Nor-

man Conquest till the seventeenth century, kings, princes, barons, lords, and even ladies were affected with the hawking mania, William I., Stephen, Edward III., Henry VIII., and Queen Elizabeth being the most enthusiastic of its royal devotees. Change in fashion, but above all the introduction everywhere of the fowling-piece, which so vastly increased the quarry, whilst at the same time doing away with the difficulty and expence of breeding, training, and keeping the hawks, led to the rapid decrease of the sport after the Commonwealth, so that, by the end of the seventeenth century, F. had fallen into general decay. The last owner of heron-hawks died in 1871, yet the foundation of the Old Hawking Club about the same time served to prevent the art becoming entirely obsolete. Hawks are now trained and used at R.A.F. airfields to clear runways and air approaches of birds in flocks.

Stringent and oppressive laws were early made respecting F., as of all other forms of field sport. Thus, under the Normans the privilege of keeping hawks was reserved only for persons of the highest rank, and it was not till the Carta de Foresta had been wrested from King John that the privilege was extended to all freemen. In Edward III.'s reign, every person finding any species of hawk was instructed by statute to take the same to the sheriff of the co., or to suffer two years' imprisonment; moreover, the stealing of a hawk was made a felony. According to a decree of Henry VII., the stealing or destruction of falcons' eggs brought on the offender a penalty of imprisonment for a year and a day, the term being reduced under Elizabeth to three months. A sixteenth-century ordinance, which forbade hawking from Easter till after the harvest, is of interest as indicating a consideration for agriculture and a smaller regard for the falconers' interests. Further regulations assigned the sort of hawk proper to persons of different ranks.

Thus the eagle, vulture, and merloun were for an emperor; the gerfalcon and tiercel of the gerfalcon, for a king; the falcon gentle and the tiercel gentle, for a prince; the falcon of the rock, for a duke; the falcon peregrine, for an earl; the bastard, for a baron; the sacre and sacret, for a knight; the lanier and laneret, for an esquire; the marlyon or merlin, for a lady; the hobby, for a young man; the goshawk, for a yeoman; the tiercel, for a poor man; the sparrowhawk, for a priest; and the kestrel, for a knave or servant.

'Eyasses,' or 'eyesses,' are birds taken from the nest and reared wholly or partially in confinement. These may be flown at pigeons, blackbirds, grouse, partridges, wild duck, pheasants, and indeed all minor quarry. 'Passage,' or wild-caught, falcons are entrapped during the migration or passage from N. to S. in the autumn by means of a decoy-pigeon and a lownet. They are usually better-tempered, swifter, and higher-couraged than the eyas, and are especially used for rooks, herons, and sea-gulls. The

training of the eyes differs from that of the passage-hawk, as it has everything to learn, including the way to catch and kill its own prey. The nestling is put on a straw-covered platform in an outhouse, and is fed three times a day on lean beef. If it receives insufficient food, 'hunger-traces' will appear like knife-marks across the point where a feather joins the flesh, and should these break the bird becomes useless. Before the young hawk is allowed to fly, 'jesses,' that is, leather straps are set round its legs, and above them bells are attached with thongs called 'bewits.' It is then allowed some weeks of liberty, when it is said to be 'flying at hawk,' the object being to instil in it a little native wildness: for desire for food brings the bird, at intervals, back to its home.

The training for eyasses is practically the same as that for wild-caught falcons. 'Hooding,' that is, obscuring the light by means of a leathern cap, is the first operation as a 'hooded' bird will sit quite quietly, and will not damage her feathers or, otherwise get out of hand by 'bating,' that is, fluttering from the fist or perch. Feeding is only once a day, and always upon the gloved hand. Soon the hawk is 'called off' to the 'lure.' The most common kind of 'lure' consists of a flat leather-covered piece of lead, to which pigeon's wings are attached, and also on either side a piece of raw meat. This is later used for luring the falcon back to its owner after a fruitless flight, and this is why the bird is made acquainted with it from the very first. During the training, the hooded hawk is perched on an assistant's hand, being fastened thereto by a leash, whilst the falconer, at a distance of 20 yds. or more, flourishes the lure. When the bird is unhooded, it flies to the flesh on the lure, which is her reward for the flight. After a time she can be trusted to do this without being held by the line or leash. Finally, she is 'entered' at the 'quarry,' that is, she is allowed to go off from the fist to kill a live fowl dangled at the end of a long line. She is then ready to be flown at wild game. The elaborate processes which belong to the management of a hawk are responsible for the development of a whole technical language to describe them. A few have already been mentioned; whilst as regards the behaviour of the hawk, 'to mount' means to wait on high; 'to bind,' to fasten on the quarry in the air; 'to stoop,' rapidly to descend on her prey from a height; and 'to tower,' to soar high above it.

Hawking has an extensive bibliography, including Lady Juliana Berners's *Boke of St. Albans*, 1486; G. Turberville's *Booke of Falconry*, 1575-1611; H. Schlegel and A. Wulverhorst, *Traité de Fauconnerie*, 1844-53; and the standard Eng. work entitled *Falconry in the British Isles*, by F. Salvin and W. Brodick, 1855. See also G. E. Freeman and F. H. Salvin, *Falconry: its Claims, History and Practice*, 1869, 1873; G. Lascelles, *Falconry*, 1892; E. B. Michell, *The Art and Practice of Hawking*, 1900; R. Blome,

Hawking, 1929; and A. Fleming, *Falconry and Falcons*, 1934.

Faldstool, was originally a folding seat, which a bishop in the Rom. church would use when not enthroned in his own cathedral. The word was later applied to the small desk at which, in Eng. churches, it is customary for the clergyman to read or chant the litany.

Falémé, or Tenne, important trib. of the Senegal in Senegambia, W. Africa. Rising in Futa-Jallon, it flows northward to the confluence above Bakel. Cascades and rapids impede all navigation 120 m. from the mouth.

Falerii (mod. Civita Castellano), one of the twelve chief cities of Etruria, lying 32 m. N. of Rome. It was finally reduced to Rom. rule in 241 B.C. The fine walls



A GATE AT FALERII

with towers and gates are the sole remnant of Rom. days, the site having been abandoned after A.D. 1033.

Falernian Wine, noted and favourite wine of the Romans. Its name was derived from Falernus Ager, a dist. of Campania, Italy, about 20 m. N. of Naples. Horace described it as 'surpassing all wines.' Later, the quality of the wine decreased, on account of the lack of careful cultivation.

Falguière, Jean Alexandre Joseph (1831-1900), Fr. sculptor and painter, studied at the Ecole des Beaux-Arts. His statues are superior to his work in oils, but in these latter he displayed a fine appreciation for the most delicate gradations of light and shade, an appreciation which plastic art almost invariably develops. Of his oil paintings 'Acis and Galatea' deserves mention, whilst his 'Wrestlers' and 'Fan and Dagger' hang in the Luxembourg. Splendid and arresting vitality animates all his sculpture, one of the most impressive illustrations of which is his 'Triumph of the Republic' (1881-86), a quadriga for the Arc de

Triomphe in Paris. 'Joan of Arc,' 'Balzac,' and 'Lamartine' exhibit his skill in historical portraiture.

Faliero, Marino (c. 1274-1355), doge of Venice, gained an illustrious victory in 1346 over the Hungarians who were trying to storm Zara, but after his election as doge in his native city in 1354 all his good fortune deserted him. Petrarch describes F. as wise and clear-headed, a description which does not tally with his behaviour as doge, for he suddenly developed an overweening ambition, and, weary of the insolence of the nobles, entered into a conspiracy with the common people to destroy them. But the plot failed, F. was executed, and the Council of Ten became stronger than ever. See Byron's *Marino Faliero* and A. C. Swinburne, *Marino Faliero: tragedy*, 1885.

Falk, Paul Ludwig Adalbert (1827-1900), Prussian statesman. Bismarck, having determined on an anti-Catholic policy in 1872, welcomed F. as minister for education. It was F. who drafted the four measures known as 'Kulturkampf,' by which the state arrogated to itself direct control over eccles. matters. A reaction in governmental policy coupled with the death of Pius IX. obliged F. to resign his office in 1879.

Falkenhayn, Erich Von (1861-1922), Prussian general, b. at Thorn. Was in the China Expedition, 1900. Chief of Staff of the XVI. and later of IV. Army Corps. Appointed in 1911 Commander of 4th Guards (Infantry) regt. General, 1913. Ger. minister of war in 1914. Chief of the Ger. Headquarters Staff and successor to Gen. Von Moltke; the frustration of whose plans at the first battle of the Marne and in E. Prussia called for a reconstruction of the Staff. His staff work was undeniably good, and though aided by such generals as Von Mackensen, not to speak of the popular idol Hindenburg, it is not too much to say that credit is mainly due to him for the battle of Tannenberg on the E. Front, the repulse of the Allies at Loos, Neuve Chapelle, and elsewhere on the W. Front, and the failure on the Gallipoli peninsula. In 1916, however, the Ger. armies met with disaster at Verdun, where Pétain repulsed probably the heaviest blows delivered in the war, and on the Somme, where the great retreat to the Hindenburg Line had to be organised. These Ger. failures were capped by the sudden entry of Rumania into the war; but Falkenhayn proved equal to this new belligerent, and gradually reduced its army to a negligible quantity. In these operations he was Commander of the 10th Army. The Ger. Press, however, were disappointed over the general results of 1916, and Falkenhayn was accordingly shelved for Hindenburg, going on a mission to Turkey. After this he dropped out of public notice, and was put on half-pay at his own request in 1919. See life by H. v. Zuehl, 1926.

Falkenhorn, Nikolaus von (b. 1886), Ger. soldier in the First and Second World Wars. Lieutenant-general in command of the 21st Army Corps in the Polish cam-

paign (1939). Promoted general of infantry and put in command of the forces which seized Norway and expelled the Brit. forces (May 1940). Commander in the White Sea region in the Russo-German campaign, July 1941. Superseded in 1944 by Lothar Rendulic (Nov. 1944).

Falkirk, municipal burgh and mkt. tn., 11 m. S.E. of Stirling, in Stirlingshire, Scotland. It stands high and overlooks the fertile Carse of F. To the N. and S. respectively pass the Forth and Clyde and Union Canals, whilst its port, Grangemouth, is 2½ m. to the N.E. Within 3 m. of the tn. are the Carron ironworks and some extensive coal-fields, which account for the supremacy of F. in the light casting trade of Scotland. Local mkt. days have reduced the importance of its three ann. trysts or fairs. Historically F. is noteworthy as the scene of two battles, one in 1298, when Edward I. defeated Wallace, and the second in 1746, when the miserable performance of the Brit. dragoons under Gen. Hawley secured an easy victory for Prince Charles. The remains of Sir John de Gruhame, a friend of Sir Wm. Wallace, and those of Sir John Stuart, who were slain at the battle in 1298, lie in the churchyard. F. with Stirling and Grangemouth send a member to Parliament. Pop. 33,000.

Falkland, Lucius Carey, second Viscount (c. 1610-43), was educated at St. John's College, Cambridge, made a happy marriage, which his father regarded as a mésalliance, and settled down at his country-seat to study Gk., which he soon mastered. F. was a man of lofty ideals, unflinching integrity, and true intellectual vision, whose whole life was rendered a despair and tragedy, because he was obliged to live through the bitter and hopeless struggle between Charles and his parliament. As a member of the latter he in vain lifted up his voice to secure some semblance of a trial for Strafford, and it was the violence and illegality of the Puritan party which forced him over to the side of the king, whose empty promises he at first believed. Clarendon, his friend, who writes that 'mankind could not but admire and love him,' persuaded him to accept the secretaryship of state. The duplicities of the Royalists broke his heart, and realising that the hour of compromise had passed and that his was a completely isolated position, splendid though it was, he voluntarily ended a brief but unhappy existence by courting and winning death at the battle of Newbury.

'Falkland, Samuel,' see **HEIJERMANS**, HERMAN.

Falkland, royal burgh, 9 m. E.N.E. of Kinross, in the E. of Fifehire, Scotland. Brewing of ale and linen-weaving are still carried on, but the old-world vil. is noted for its anct. palace of the Stuarts. James III. converted Thane's Tower into a royal palace in 1538, and two round towers in the W. wing were added by James V. who died here in 1542. As a child Queen Mary loved to stray in its woods, and the castle is full of historic association. It was restored in 1888, but before that day Carlyle had likened it to 'a protrusive shin-bone

striking through the soil of the dead past.' Pop. 800.

Falkland Islands, group, forming a Crown colony of Great Britain in the S. Atlantic Ocean, lying some 300 m. E. and somewhat to the N. of the Straits of Magellan between 51° and 53° S. lat., and 57° and 62° W. long. In addition to the two main is., known as E. and W. Falkland, which are divided by the Falkland Sound, the group comprises about 200 smaller is. clustered around them within a space of 120 m. by 60 m. The area of the group, according to the Admiralty chart, is: E. Falkland and adjacent is. 2580 sq. m., W. Falkland and adjacent is., 2058 sq. m. The coast line is deeply indented, and has many fine harbours and anchorages. The surface of the is. is hilly, reaching a maximum elevation of 2315 ft. in Mount Adam on W. Falkland. There are no rivers navigable at any distance from the coast. The whole area is wild moorland interspersed with outcrops of rock and angular boulders called 'stone runs' the origin of which is conjectural. The soil is mainly peat varied by large areas of sand. The general appearance of the land is one of bleak inhospitableness. Trees are almost entirely absent and the scenery is not unlike that of parts of Scotland. There is no cultivation except near the farm settlements and shepherds' houses where vegetables, oats and hay are grown. The climate is characterised by the same seasonal variations as in the United Kingdom, though the winters are slightly colder and the summers much cooler than in London. The ann. rainfall averages only 26 in. The only tn. is Stanley, the cap., situated on a natural harbour entered from Port William, at the N.E. corner of the group. The whole acreage of the colony is divided into sheep farms carrying on the average between 8000 and 35,000 sheep or about one sheep to every 3 to 5 ac. The colony has no resources of known value apart from the production of wool, skins and tallow. A large number of sheep are exported to Chile. The pop., which in 1939 was 2400, is almost entirely white and has been derived largely from the United Kingdom. There is a considerable element of Scandinavian blood. The F. I., called by the Fr. 'Iles Malouines' and by the Spaniards 'Islas Malvinas', were discovered on Aug. 14, 1592, by John Davis in the *Desire*, one of the ships of the squadron sent to the Pacific under Cavendish. Capt. Strong in the *Welfare* sailed between E. and W. Falkland in 1690 and called the passage the Falkland Sound in memory of Lucius Cary, Lord Falkland, and from this the group afterwards took its Eng. name of 'Falkland Islands' although this name does not appear to have been given to it before 1745. The first settlement was estab. in 1764 by de Bougainville on behalf of the king of France, at Port Louis on E. Falkland; but in the following year Capt. Byron took possession of W. Falkland and left a small garrison at Port Egmont on Saunders Is. The Spaniards bought out the Fr. and forcibly ejected the Brit. 1766-70. Later the group remained with-

out voluntary occupation until 1829 Louis Vernet, who enjoyed the nominal protection of the Republic at Buenos Aires, planted a new colony at Port Louis. Finally, in 1833, Great Britain who had never relaxed her claim to the sovereignty of the F. I., expelled the Argentine soldiers and colonists, and resumed occupation, which has been maintained without interruption to the present day. In 1844 the headquarters of the Gov. were removed from Port Louis to Stanley, then called Port William. On Dec. 8, 1914, they were the scene of the naval battle in which Adm. Sturdee destroyed Adm. Graf von Spee's squadron (see next article). A memorial commemorating this victory was unveiled at Stanley in 1927.

The *Dependencies* of the F. I. are divided into two main groups, the one consisting of S. Georgia with the S. Orkneys and the S. Sandwich Is., and the other of the S. Shetlands, with Graham Land. Large areas of land in the Antarctic Continent are also comprised in the Dependencies. There is no permanent pop. in the Dependencies except in South Georgia where the figures fluctuate with the seasons of the whaling industry. Apart from sealing on a small scale, the only industry in the Dependencies is whaling, and whale and seal oil and by-products of the whale, such as guano, are their sole products. Constitutionally, the Dependencies are subject to the same authority as the colony proper, that is to say, to the Governor and to the Executive and Legislative Councils of the F. I. (See SOUTH GEORGIA; SOUTH SHETLANDS.)

The Brit. claim to the Dependencies, though contested, is strong: for Graham Land was first visited in 1820 by Edward Bransfield R.N. and, apart from the expeditions of Scott and Shackleton, there have been far more Brit. expeditions to Antarctica (76) than by any other nation, the next being Norway (29) and America (24). The Dependencies were declared Brit. possessions by letters patent of 1908 and 1917, and S. Georgia has had a resident magistrate since 1909. In recent years there has been much activity on the British Falkland Island Dependencies Survey, whose main task has been meteorology and the mapping of unexplored parts of the mainland. In this work the Survey took over the duties previously performed by the Discovery Committee (*q.v.*), whose ships were diverted in 1939 for war uses; and from that year until 1943 Graham Land and the southernmost group of is. were not visited annually as they had been for the previous twenty-nine years. For the 1943-44 season two ships were acquired—the *Fitzroy* for carrying stores and the minesweeper *William Scoresby*—and an expedition was fitted out under Lt.-Cdr. J. W. S. Marr, R.N.V.R. to complete the mapping of Graham Land, the estab. of wireless weather stations and the economic survey of this Antarctic sector. So far as conflicting territorial claims are concerned it is to be observed that Norway has sovereign claims to the area between Coats Land, in the Dependencies, and the

Australian Antarctic Ter. whose validity is accepted by the United Kingdom, Australian and New Zealand Govs.; and France's claim to Adélie Land is also recognised by Britain. The Governor of the F. I. sailed in Jan. 1918 in a frigate to the F. I. Dependencies sector of Antarctica mainly for the purpose of re-establishing Brit. stations at Admiralty Bay on King George Is., S. Shetlands, and at Port Lockroy in the Palmer Archipelago. At the same time the Brit. Gov. protested to the Argentine Gov. against the attempt by their navy to establish meteorological installations on Brit. soil in the S. Shetland Is.

See L. B. Mackinnon, *Account of the Falkland Islands, 1840*; G. Schulz, *The Falkland Islands, 1891*; J. R. St. Johnston, *The Falkland Islands, 1920*; V. F. Boyson, *The Falkland Islands* (with notes on the natural history, by R. Vulliamy), 1924; J. Goebel, *The Struggle for the Falkland Islands: a Study in Legal and Diplomatic History, 1927*; F. C. Macdonald, *Bishop Stirling of the Falklands, 1929*; L. Harrison Matthews (of the *Discovery* Expedition, 1924-27), *South Georgia: The British Empire's Subantarctic Outpost, 1931*; F. D. Ommancey, *South Latitude, 1938*.

Falkland Islands, Battle of. Naval battle of the First World War, fought on Dec. 8, 1914, in which the Brit. Adm. Sturdee, completely avenged the defeat of Rear-Adm. Cradock off Coronel (q.v.). The Ger. squadron comprised the armoured cruisers *Scharnhorst* (flagship) and *Gneisenau*, light cruisers *Leipzig*, *Dresden* and *Nürnberg*, under the command of Adm. Graf von Spee. The Brit. squadron consisted of the two battle cruisers *Invincible* and *Infexible* (17,250 tons, 25 knots, carrying eight 12-inch and sixteen 4-inch guns), the armoured cruisers *Cornwall* and *Kent* (each 9800 tons and carrying fourteen 6-inch guns) and the light cruisers *Glasgow* and *Bristol* (4800 tons, two 6-inch and ten 4-inch guns). The *Scharnhorst* and *Gneisenau* carried twelve 8-inch guns. The intention of the Ger. squadron (betrayed, it was alleged by the Gers., from Chilean sources), was to bombard the Falkland Is. and Von Spee reached the vicinity of this Brit. colony on Dec. 8. The appearance of the Brit. squadron was a complete surprise and the Ger. ships promptly took to flight. Their speed, however, was inadequate, and they were brought to bay, the Gers. being outmanoeuvred for position and out-ranged in gunfire. All the Ger. ships, with the exception of the *Dresden* (q.v.), were sunk. The *Scharnhorst* was sunk three hrs. after the first shot was fired, the *Gneisenau* two hrs. later. The *Leipzig* was sunk by the *Cornwall* and the *Nürnberg* was sunk in flight by the *Kent*. The Ger. casualties were 2000 officers and men, the Brit. seven killed and four wounded. There were no survivors of the *Scharnhorst*, while of the *Gneisenau's* complement of 700, fewer than 100 were rescued. Von Spee himself perished. The secrecy of the Admiralty's move against Von Spee's raiding squadron was signal proof of

efficiency. Adm. Sturdee was awarded a baronetcy for his victory. The vital importance of this victory lay in the fact that it prevented Von Spee from establishing himself in the W. Indies and thereby raiding 20 million tons of sea-borne grain and meat supplies intended for Great Britain. On the defeat of Cradock's squadron at Coronel, the Brit. Admiralty at once prepared this counterstroke, and Adm. Sturdee, on Nov. 11, steamed away with the cruisers *Invincible* and *Invincible*, reaching the Falklands with almost unprecedented speed. By Dec. 7, when anchored in Port Stanley, he had been reinforced by Adm. Stoddart in the *Carnarvon* and by the cruisers *Cornwall*, *Kent* and *Glasgow*. The Brit. squadron coaled all night, and was still coaling when the look-out station reported that the Ger. squadron was approaching, it being then nearly 8 a.m. By 10 a.m. all the Brit. ships were under way, and the first shots were fired just before one o'clock. In 6½ hrs. from that time the battle was over; the Ger. squadron having no reasonable chance against the attacking squadron. The whole campaign in these waters is of importance in that it illustrates Great Britain's essential vulnerability. There was no parallel in Brit. maritime hist. to the dangerous economic consequences that threatened Coronel. Brit. national security was actually in danger through a more or less obscure defeat in a remote corner of the Pacific at the hands of a detached raiding squadron, and only the prompt extinction of the raiders could have restored confidence to the merchant navy.

Fall, The, expression used in Christian theology for the spiritual change engendered in Adam and Eve after their temptation by Satan in the Garden of Eden, a change due to their knowledge of, and contamination with, sin. This account of the entrance of sin into the world is responsible for some of the fundamental doctrines of the theology professed by orthodox Christians, Catholics and Protestants alike. By sin, Adam lost the divine life of supernatural grace which was his heritage. Inasmuch as Adam is the supreme head or source of humanity, all mankind must bear the taint transmitted for all time from Adam as the penalty for his (Adam's) unique transgression of God's will. But the burden of this 'original sin' has been lifted from mankind because Jesus was crucified to restore divine life to mankind and to avert from all who believe in Him the punishment which would otherwise be meted out after death for their share in Adam's fall. Thus the merits of the Saviour give to the Faithful eternal life.

Falla, Manuel de (1876-1946), Sp. composer b. in Cadiz. At the Madrid Conservatory he studied composition under Pedrell, the founder of the modern national Sp. school of composition, and the piano under Trago. In 1905 his 'La Vida Brava' won the prize offered by the Academia de Bellas Artes for a national opera but it waited eight years for its first performance. From 1907 to 1914 de

F. lived in Paris, receiving friendly encouragement from Debussy, Ravel, Dupas, and others, but he returned to Spain at the beginning of the First World War. His ballet *The Three-Cornered Hat*, was performed by the Diaghilev Russian troupe in 1919, being very popular. Also the ballet *El Amor Brujo (Magician Love)* was successful, and other equally successful compositions are *Master Peter's Puppet Show (El Retable de Maese Pedro)*, a marionette opera; *Nights in the Gardens of Spain* (1916), for piano and orchestra, a Harpsichord Concerto, and *Four Spanish Pieces for the Piano* (1909). F. was a student of Sp. folk song and arranged a number of festivals to maintain its cultivation.

Fallacy (from Lat. *fallax*, deceptive) is false reasoning or argument. In spite of the countless varieties of confused thought and ambiguity, it is customary to adopt some classification of F. Thus Bacon in his *Novum Organum* divides them into four *Eidola* (False Appearances), whilst Mill regards all Fs. as belonging to one of the five following categories: (1) Fallacies of Simple Inspection, which embrace all Natural Prejudices; (2) Fallacies of Observation; (3) of Generalisation, including Induction; (4) of Syllogism or Ratiocination; and (5) of Confusion, under which come all cases of ambiguous language. But by far the most famous subdivisions of F. are those based on Aristotle. According to him all Fs. are either material, that is misstatements of facts, said therefore to be *extra dictionem*, or *in re*; verbal that is arising from the misuse of words; or formal or logical, that is arguments which transgress the laws of true demonstration, technically called the Syllogism. Fallacies of the second and third species are said to be *in dictione*, or *in voce*. Under the first heading come *Petito principii*, or *Circulus in probando* (arguing in a circle); *Non sequitur*, or the F. of false cause; *Ignoratio Elenchi*, or irrelevant conclusion; and Fallacy of Accident from the general to the particular.

Fallada, Hans (b. 1893), Ger. writer, born at Greifswald. His real name is Rudolf Ditzgen. He depicts in his works the effects on the unheroic individual of the problems of everyday life, e.g. unemployment. He is best known for his work *Kleiner Mann—was nun?* trans. as *Little Man, What Now?* (1933). Other works: *Who Once Eats out of the Tin Bowl* (1934), *Once We had a Child* (1935), *Sparrow Farm* (1937), *Damals bei uns daheim* (1942), *Der ungehebre Mann* (1945).

Fallerleben, Hoffmann von, see HOFFMANN.

Fallières, Armand (1841-1931), Fr. statesman, b. near Agen, S. France, son of a blacksmith. Practised as an advocate at Nérac. Entered Chamber of Deputies in 1876, and was Under-Secretary of State to Jules Ferry at the Fr. Home Office in 1880, and then, successively, minister of the Interior and Prime Minister. President of the Fr. Republic 1906 to 1913 and president of the Senate eight times.

Falling or Shooting Stars are small extraterrestrial planetary bodies which travel through space in countless numbers and with an illimitable variety of orbit. It is estimated that the smallest, in spite of their flame due to momentary combustion, are no bigger than large grains of sand, and further that their velocity, which is deduced from the length of its fall and the duration of its flight—rarely a second—varies from 60 to 400 m. per min. The services of photography have now been enlisted for the more accurate investigation of these meteoric bodies, but it has long been observed that star showers appear to diverge from one point, there being innumerable points or 'radiants,' as they are called, for the different showers. Thus those that proceed from Perseus are called Perseids, and other meteor swarms, such as the Leonids, Taurids, Pegasids, and Lyrids are similarly named after the constellations from which they seem to shoot. But their apparent radiation and diversity of flight are an illusion of perspective, their tracks being really parallel and subject to fixed orbital movements. On a clear but moonless night, a watcher of the heavens may see as many as ten an hour with his naked eye, whereas with a good telescope he would see at least twenty times that number. Indeed astronomers compute the number of falling stars through which the earth daily passes as some twenty millions. When they first become visible in the atmosphere they are usually from 40 to 75 m. above the earth's surface, whilst the fiery particles are on an average 250 m. apart, though in heavy showers they may be as near as 20 m. See METEORS.

Fallopian Tubes, The, so called because they were discovered by a Pisan professor, Fallopius, form the uteroperitoneal canal and carry the ova through a small opening, the ostium abdominale, among the fimbriae or fringes at the end, into the womb cavity. See UTERUS.

Fallopio (or Fallopius), Gabriello (c. 1523-82), It. anatomist. His chief physiological discovery was the function of the tubes, now called Fallopian after him, whilst in the anatomical field he made careful studies of the sphenoid and ethmoid bones and the internal structure of the ear. The *Observationes Anatomicae* (Venice, 1561), was the only treatise by F. to appear in his lifetime. His collected works, under the title *Opera genuina omnia* also pub. at Venice, appeared in 1584.

Falloux, Frédéric Alfred Pierre, Comte de (1811-86), Fr. politician, first revealed to the public his enthusiasm for the old order of things under the Bourbons in his *Histoire de Louis XVI.*, 1840. His love of education and liberty was rather peculiar to his own personality, and met with small sympathy among the legitimists to whom he belonged. As a reward for his support during the Revolution of 1848, Louis Napoleon made him minister of education, and he was able to pass the ultra-Catholic 'Loi Falloux' (1850).

Fallow (probably derived from the O. E. *fealp*, a harrow), land ploughed and tilled

but not sown for a certain period, usually a year. It was early discovered—witness the Mosaic injunction that every seven years the land must have a 'Sabbath rest,' i.e. lie fallow—that the soil decreases in fertility if continually sown with grain. Thus farmers resorted to the practice of 'fallowing,' a practice which may well be as old as agriculture itself, the object being to destroy the weeds, such as couch grass (*Triticum repens*), to disintegrate the soil, and to give it a thorough aeration. The Romans left their cultivated fields F. every alternate year, but improved crop rotations have well-nigh done away with the need of 'bare fallow,' except, perhaps, for extremely clayey soils which cannot, otherwise, be adequately cleansed. The succession of green after wheat crops is found sufficient to refresh the earth and is, of course, much more economical than to leave it quite cropless. Land submitted to this process, the green crops being potato, turnips, etc., is called 'green fallow.' Perhaps the most serious drawback to true or bare Fs. is that the nitrates are washed out, as there are no plant roots to retain them, so that the soil must be dressed with guano or manure before re-cultivation in order to restore the needful organic matter.

Fallow Chat, see **WHEATEAR**.

Fallow-deer, name given to sev. genera of Cervidae, a family of ruminant ungulate mammals; they are characterised by the expansion of the upper part of their antlers into palmate form. Usually they stand about 3 ft. high, and have small heads, large ears, and rather long tails. In colour they are fawn, with a number of large white spots, or they may be yellowish-brown, or, more rarely, dark brown. *Dama vulgaris*, the commonest species, is a native of N. Africa and the countries bordering the Mediterranean, but was introduced into Britain at an early period; *Cervus mesopotamicus* is a native of the mts. of Laristan; *C. giganteus*, erroneously called the Irish Elk, is a fossil deer of enormous size, the antlers having in some cases a span of 11 ft.

Fallow Finch, see **WHEATEAR**.

Fall River, city and port of entry, on Mt. Hope Bay, at the mouth of the Taunton R., in the Bristol co. of Massachusetts, U.S.A. It is one of the chief centres for the manuf. of cotton goods in the U.S.A. Other industries include the dyeing and finishing of textiles and the manuf. of fur goods, cordage, pianos, and men's hats. The Fall R., a small affluent of the Taunton, which here makes a descent of about 130 ft. in half a m., furnishes water power for the city's industries. Many of the buildings of F. R. are of red granite, quarried in the vicinity. There are sev. parks, Notre Dame College, a textile school, and a conservatory of music. Pop. 115,400..

Falmouth: (1) Seaport and markt. tn. in Cornwall, England. It lies 7 m. S. by W. of Truro, and its harbour is probably the finest in England. There are two graving docks, and foundries, engineering works and ship repairing yards. Granite, china-clay, copper ore, rope, and fish are

exported. F. has a wonderful climate, and nowhere in the S. of England do tropical plants flourish more luxuriantly. It has become a popular holiday centre, Penennis Castle was built in 1543 for the defence of the harbour, which is now a favourite yachting water, and the permanent anchorage of the once-famous tea clipper, the *Cutty Sark* (q.v.). Millions of oysters are dredged from the harbour every year. Pop. 13,400. (2) Tn. 18 m. E. of Montego Bay in Cornwall co., Jamaica. Pop. 2500.

False Bay, lies 25 m. S. of Table Bay, in the S.W. of the prov. of the Cape of Good Hope, S. Africa.

False Hellebore, see **VERATRUM**.

False Imprisonment, the incarceration or the detention anywhere of any person against his will and without lawful authority. In Scots law the abuse is called 'wrongous imprisonment.' The injured individual may either apply for a writ of habeas corpus, or may make an indictment against his unlawful detainers, and he is further at liberty to enter into an action for damages. See **MALICIOUS PROSECUTION**.

False Money, see **COINING**.

False Point, name of a harbour, cape, and lighthouse in the Cuttack dist. of India, so called because it is often mistaken by sailors for Point Palmyras, which lies 1½ further N. Although the port was not opened till 1860, it is the best between Bombay and the Houghi, its commercial value being largely increased by the cutting of the Orissa canals.

False Position, in arithmetic, a former method of solving a problem by one or two suppositions (also called the 'rule of trial and error'), now largely replaced by the direct method of equations.

False Pretences, see **FRAUD**.

False Swearing, see **PERJURY**.

Falsetto, expression used in singing to denote the highest register of a male voice. A F.-singer can so blend his top notes with his chest register that there is no perceptible break in passing from one to the other. As to how the larynx is affected in the production of F. tones, there is still great diversity of opinion.

Falsification of Accounts was made a misdemeanour, punishable with penal servitude for seven years, under the Larceny Act of 1861, and in Scotland is an offence under the Debtors Act of 1880. By the terms of the former Act every director or officer of a public company or body corporate is liable to the above penalty if he omit to make a full and true entry of properties received in the proper books or accounts, his purpose being to practise fraud; or if he falsify, mutilate, or destroy any book or valuable security belonging to his company or corporation; or if he make a false entry or omit to set down an important particular, or if he concur with others in doing either of these two things; or, again, if he make, circulate, or pub. any written statement of account which he knows to be untrue in any important particular, or if he concur in doing any of these three things. By the Falsification of Accounts Act of 1875

the terms of the above Act, with the penalties attaching thereto, were extended to clerks, officers, or servants who may try in any of the above ways to defraud their employers.

Falstaff, Sir John, a famous comic character in Shakespeare's *Henry IV.* (Parts I. and II.) and the *Merry Wives of Windsor*. His prototype, than whom he could hardly be more unlike, was a Lollard martyr, Sir John Oldcastle, who appears in *The Famous Victories of Henry V.*, an old play which Shakespeare adapted. Oldcastle was altered to Fastolfe so as not to shock Protestants, a Sir John Fastolfe (c. 1378-1459) having actually existed. Indeed, this Fastolfe, like the inimitable F. of the plays, earned a reputation—undeserved it seems—for arrant poltroonery in the Fr. wars.

Falster, Dan. ls., 30 m. long, and varying from 2 to 13 m. in breadth, off the S. coast of Zealand in the Baltic. Malaria is endemic in the marshes, but the soil is well watered and yields good crops. Pop. 30,000.

Falticeni, or **Folticeni**, tn. 65 m. S. by E. of Czeronowitz on an affluent of the Sereth, and cap. of the dept. of Suceava, Rumania. Pop. about 10,000, one half Jews.

Falu, or **Fahlun**, tn. and cap. of the dist. (län) of Kopparberg, 50 m. W. of Gävle in Sweden. The Kopparberg Mining Company, which has been in existence since 1284, controls the oldest copper mines of Europe. Up to the year 1900 there had been mined some 35 million tons of copper ore. Its present copper output is insignificant, but the company owns many iron-ore mines and large sulphate and sulphite and paper mills. F. has two medieval churches and a seventeenth century tn. hall. It has also an excellent industrial museum. Pop. 14,000.

Fama, in classical mythology, is the personification of Rumour, and finally came to be identified with Evil Report. The Gks. erected temples to her at Athens and Smyrna, but the Romans did not follow their example. Sophocles conceived of her as the daughter of Hope.

Famagusta, or **Famagosta**, seaport tn. on the E. coast of Cyprus, 2½ m. S. of the anct. Salamis. Arsinoe was founded by Ptolemy Philadelphus in 217 B.C. The Christian refugees from Constantia in the reign of Mu'awiyah settled in Arsinoe, which soon became an archbishopric of the Orthodox Church, the name being changed to F. It is now famous for its walls and the fine cathedral of St. Nicholas. The Christians live in the suburb of Varosia, the Moslems, within the walls. F. is the port at which many travellers land in Cyprus, a special train conveying them thence to Nicosia, the cap. In the wealth of historical remains and antiquities of Cyprus, the Venetian fortifications and the church of St. George of the Latins, in F. are noteworthy. Grants by the Leverhulme Trustees for research have given a new impetus to the clearance and investigation of the monuments and fortification of F. The Cyprus Gov. railway runs

from F. through Nicosia to Kalokhorio. Pop. 9000.

Familiar (from Lat. *familiaris*, to do with the family), a demon or supernatural spirit, who is the slave of wizards, magicians, and all necromancers, and who responds to his master's call and carries out his wishes. The idea of such an attendant spirit is world-wide. Thus the Arabs used to believe in the Aladdins or genii of the lamp, whilst Eskimos are still superstitious about their 'torn gaks,' and the Hindus and Persians had faith, like the Romans, who set great store by their 'Lares' and 'Penates,' in presiding household deities. In the Dark Ages all Europe recognised the power of the magicians of Salamanca to imprison evil Fs., and the Christian conception of guardian angels may be connected with belief in such spirits. Agrippa's dying anathema pronounced on his black dog, who embodied his F., is worthy of quotation: 'Abi, perdisa Bestia, que me totum perdisit.'

Familiars of the Holy Office were lay officers of the Court of Inquisition whose chief duties were to apprehend and imprison the accused. They were so called because they were admitted to the secrets of the body they served.

Familists, see FAMILY OF LOVE.

Family, **The**, means in modern times the social group consisting in the narrower sense of the man, his wife, and his children, and in the wider sense of all those who, in varying degree, can claim kinship with that F. whether from the father's or the mother's side. As with all primal origins, the nearer the historian approaches to its final source, the greater is his difficulty in securing reliable data. But from the welter of confusion and doubt there arises this fact, namely, that the most primitive type of F. was matrilineal, that is one in which kinship was counted only on the mother's side. Such is the case with the Nairs of Malabar, whose social organisation is of the rudest kind, and also among all tribes with whom 'beenah' marriages prevail. Among the Nairs the true F. comprises the woman with her children, mother, and brothers. The husband as a necessary constituent of the group is unknown, the procreation of children being dependent on the casual visits to the woman's house of men who come there for that purpose and then depart. Under these circumstances the uncles, her brothers, become the guardians of the younger generation, and eventually make its members their heirs. The term 'beenah' is taken from Ceylon and describes all marriages which result in the man going to live with his wife's folk and forsaking his own tribe in order to secure adoption into the woman's. Such a practice was popular among the Semites of Arabia until comparatively recent times. Moreover, the Book of Genesis offers indubitable evidence that it was the custom among the Hebrews in some remoter period. The 'beenah' husband came to live with the woman in her tribe and among her kinsmen, his offspring being invariably counted among his wife's and not his own F.

A slight advance on the Nair F. is that found among certain savages in Tibet and constantly referred to, on that account, as 'Tibetan polyandry.' Here the wife goes to live with a number of brothers belonging to some other tribe, who are all by turns her husband. The head of the F. is the eldest brother, who can lay lawful claim to all the woman's children: when he dies, the next brother succeeds, and when all the brothers are deceased their privileges pass to the brotherhood's eldest son. The marriage custom of the Britons, as described by Caesar, bears some resemblance to this, whilst in Strabo there is recorded a similar polyandry among the Arabs, and from the Mahabharata it is clear that an identical custom once prevailed among the Hindus. Such is the evidence of ethnology prescinding from revelation as a possible source of knowledge.

Polyandry certainly seems quite at variance with all preconceived notions of the relative position of man and wife in bygone ages, hence many investigators regard it as a corruption of a more primitive family institution, induced by economic pressure or sloth. Polyandry has, indeed, a purely practical and economic basis. Mankind in early days had a tremendous struggle for existence, and found it necessary to restrict the number of women by infanticide, as well as by polyandry. It was not till the food supplies became more assured and until such developments as the domestication of cattle came about that men found they could afford to have a wife each, and began moreover to attach a value to the field as to the household work of the other sex. The matriarchal character of the F. was a natural result of the uncertainty of fatherhood and the practical impossibility, in many cases, of discovering it. Exogamy—that is, marriage outside of the tribe—has been the fashion among all races for all known time, and it is this, coupled with female kinship, which accounts for the diffusion of the totem F. throughout numerous tribes—a fact for which Maine, with his patriarchal theory of the development of the F., could offer no satisfactory explanation. Totem F. must have been isolated at first. Afterwards, when exogamy was introduced, the children of the woman would naturally adopt her totem—that is, worship the plant or animal which she regarded as sacred, and after they had grown up and married, would carry her totem with them to a strange group or tribe. This hypothesis satisfactorily explains the existence of distinct clans within the same tribe.

The male kinship, which was the rule in the polyandry of Tibet, contains the germ of the modern patriarchal, as also of the monandrous, F., and it is obvious that the purchase system was a further step in that direction. Thus Isaac gave a bride's price or bridal gifts for the privilege of taking Rebecca away to his own people, and purchase marriages were from early periods common among Arabs and Hindus. There was no doubt a long struggle between the Nair and 'beenh' Fs. on the

one hand, and the purchase system on the other, but in spite of the sacred and valid nature of a kinship established in a totem group, the latter tended everywhere to survive and finally to oust the other. The 'Levirate' was another aid to the establishment of the man's supremacy over his wife and children. For by this process, which was adopted by both Hindus and Hebrews, he might allow his brother or a friend, for a sum of money or else for love, to borrow his wife, and might then appropriate to his own family any offspring from their promiscuous association. This was a favourite means for a wealthy man to strengthen his kindred or F., for he was legally the parent of all his wife's children, no matter to whom she bore them. When, with the growth of true paternal and other higher feelings, the idea took root that actual procreation was essential to the claim of fatherhood, then the patriarchal F. may be said to have been firmly established. Monandry became the rule, and with the decline in the status and importance of women, and likewise with the growth of what is now called conjugal infidelity, polygamy became a recognised and even lawful licence, as indeed it still is among the Ashantis and most of the aboriginal tribes in Australia to-day. Rome offers the most perfect example of a rigidly patriarchal F. Indeed the Eng. word is derived from the Lat. *familia*, which meant primarily a 'household of slaves.' That this same word came to include his wife and F., with the rest of his domestic property, may not unfairly be taken to illustrate the small esteem in which the *pater familias* regarded them. Indeed the *patria potestas*, or 'power of the father,' was absolute, including even the power of life and death over all his immediate dependents and relatives. But it is a hopeless error to argue, as has not infrequently been done, that the Rom. system is the type of the group or F. from which have sprung all tribes and nations, even though the legendary growth of Israel from Jacob and his twelve descendants, and the Genesis story of the peopling of the world from the posterity of Noah lend support to such a theory. See B. S. Phillpotts, *Kindred and Clan in the Middle Ages and After*, 1913; H. Bordeaux, *Pierres du Foyer*, 1917; E. S. Hartland, *Primitive Society*, 1921; E. B. Goss, *Hebrew Families*, 1927; E. B. Reuter and J. R. Munner, *The Family*, 1931. See also ENDOGAMY; ETHNOLOGY, *Society*; EXOGAMY; PARENT AND CHILD; POLYANDRY; POLYGAMY; TOTEMISM.

Family Allowances. A system, which prevails in Canada and the U.S.A., under which the state makes an allowance to mothers on widowhood or incapacitation of the husband or who are without adequate means of support. In Canada, mothers' allowances are granted, under Acts of Parliament in seven of the nine provs. Manitoba was the first to make such provision in 1915, and the example has been followed by the other W. provs. and by Ontario, Nova Scotia and Quebec. The conditions governing the grant of the allowance vary, however, as between the

different provs., e.g. incarceration of or desertion by the husband is not admissible in some provs., but, subject to qualifications, is in others. The maximum amount varies from \$42.50 a month for the mother and first child in Brit. Columbia, with \$7.50 for each additional child, to \$30 for a family in Saskatchewan. Opponents to F. A. argue that it would tend to encourage an imprudent increase in the size of families; but this does not appear to be borne out by facts in America.

Child endowment was the analogous principle in England (prior to the passing of the Family Allowances Act, 1945), and in the continental countries of Europe. This is the principle of supplementing wages by a payment in respect of dependent children, and the system has been in force in England and on the continent as far back as 1795, the first instance occurring in England in that year. It also prevails in Australia. See on this Eleanor Rathbone's *Disinherited Family: a plea for the Endowment of the Family*, which contains a complete survey of the system in various countries. A new chapter in developing the welfare of the children of Britain was opened, however, by the Family Allowances Bill, which provided for financial assistance from the Exchequer to over 2,500,000 families in which there was more than one child. Under this measure, an allowance of 5s. a week was to be paid to parents for each child after the first in a family, the estimated cost to the Exchequer being £57,000,000 for the first year. Sir Wm. Jowitt, Minister of National Insurance, in moving the second reading on March 8, 1945, said that the primary object of the Bill was to ease the financial burden which oppressed parents with large families, and so promote the health and well-being of the children. Under the Bill the gov. also decided to give a great increase in the free meals and milk for children in grant-aided schools, the scheme costing £60,000,000 a year when fully developed. Its committee of the House an amendment was agreed to providing that the allowance should be paid to the mother in the case of the family of a man and his wife living together. Before further progress was made the coalition gov. ceased to exist. The new minister, on June 11, submitted fresh clauses intended to meet objections, particularly on the score of the treatment of the families of servicemen. He said (contrary to the argument of the previous minister that payment of allowance to servicemen involved duplication of allowances), the gov. thought that members of the forces were as much entitled to benefit as any other wage-earner and they would receive the F. A. in addition to any other allowance paid to them. The Bill was then passed through its remaining stages and received the Royal Assent on June 15, 1945.

Family Compact, name given to various treaties between the reigning Bourbon dynasties of France and Spain, also including Naples and Parma, during the eighteenth century. These treaties were made in 1733, 1743, and 1761. They

aimed at establishing the Bourbon dynasties in Italy, and also at checking the expansion of England in the colonies of the American continent at the expense of France and Spain. They are an important feature in the great eighteenth century wars of the Polish and Austrian succession.

Family of Love, or Familists, religious sect founded by David Joris at Delft in Holland (1501-56). They taught that religion was nothing but love which united man with God, and that there was no need for any doctrine or ceremony. Blunt in his *Dictionary of Sects* (1874) avers that they also denied the reality of sin, and were Antinomians; he divides them into two congregations, known as the 'Family of the Mount' and the 'Essentialists.' The teaching was brought to England by Henry Nicolai, and in 1575, having been attacked by the Puritans, they petitioned Parliament for toleration. This was, however, not granted, and five years later we find Elizabeth ordering them to be put down as a 'damnable sect.' They are mentioned in the writings of George Fox and Henry Moore, but seem to have disappeared during the seventeenth century.

Famine, scarcity of food-products of such a nature that the population of a dist. or country is reduced to actual starvation, or the serious danger or probability thereof. The causes of such a scarcity are principally meteorological, i.e. prolonged drought, or sometimes excessive rainfall and storms, leading to floods and the destruction of crops and stores. Crop diseases, the ravages of locusts and other pests, are among other causes; and the decimation of an agric. pop. by war, plague, etc., and economic causes which deprive a pop. of means of purchasing food-stuffs have also contributed to a state of F. The opening up of the world's food products to all nations by the development of rapid mechanical transport has been the main reason why the risk of F. has materially declined, and transport facilities are the principal object in combating a F. when it occurs to-day. Though serious Fs. occurred in Russia in 1892 and 1905, it is chiefly in the E., in such a vast and unorganised country as China, that F. on a large scale is dreaded. Still more marked is the ever-present threat of Fs. in India, where the people are to a large extent dependent on agriculture, and where a failure of the monsoon for a single year may result in a total failure of the crop. It is not so much the actual want of food-supplies that is the serious factor to be combated, as the immediate want of purchasing power resulting from cessation of the only money-producing labour. Thus the great Indian schemes of famine fighting include not only constant development of irrigation and transport, but elaborate relief works, loans, etc. Problems of food supply and distribution loomed large in Bengal during the Second World War, owing to the rise in prices of agric. produce and raw material and hoarding of supplies. This was advantageous to the peasant cultivator but fatal for the general population of Bengal.

It is estimated that 1,500,000 men, women and children died in Bengal in 1943 and 1944 as a direct result of the famine and the consequent epidemics (see report of Sir John Woodhead's Famine Inquiry Commission, pub. in India, May, Sept. 1945.)

Famund, or **Faemund**, lake of Norway, situated 85 m. S.W. of Trondhjem. It is about 38 m. in length, and its greatest width is 5½ m. The Oster Dal flows from it.

Fan, see **FLABELLUM**.

Fan. This term, derived from Lat. *vanus*, the F. used for winnowing chaff from grain, is used for various devices for creating a current of air, and thus cooling the atmosphere of a room, as in the propeller-shaped electric F. or in other elaborate devices for regulating the temp. driving fresh air into or otherwise ventilating a room or building. The 'punkah' of the E. attached to a rope which is steadily pulled by a servant, is familiar to all travellers and residents in India. It is, however, as the light implement, carried in the hand and used for cooling the face, that the F. has historical and artistic interest. Of these F.s., there are two main types, the rigid and the folding F.; the first consisting of a circle or segment of a circle of light material fixed to a handle by radiating plates of wood, etc.; the second in which these radiating plates fold together and bring the flexible leaf into a small flat compass. The folding F. came originally from Japan, and was thence brought to China and so to Europe. In the E., F.s. were used by both sexes, and were the central feature in many elaborate ceremonies. The Jap. had war-F.s., coloured bright red, and there are some fans which possess a small poniard concealed in the handle. The Chinese devoted much marvellous art in carving the ivory, tortoise-shell, etc., sticks of the handle. The fixed F. dates from very ancient times. A wooden handle, which once held ostrich feathers, is in the museum at Cairo; it belonged to Amenhotep, the Pharaoh of Egypt of the seventeenth century B.C., and feather-F.s. borne by slaves and servants are found on monuments of all ages. They were used in the medieval Church to keep flies from the chalice; large feather F.s. *flabella*, are borne behind the pope in processions and in many E. and other countries, the state-F.s. are attributes of royalty and power. The folding-F. was used in England in the reign of Henry VIII. They were introduced from Italy to France by Catherine de' Medici. Spain was the centre for the decoration of F.s., while the carved and decorated framework was made in France and sent to Spain. In the eighteenth century many of the first artists, Boucher, Watteau, Lancret, etc., designed the decorations and scenes to be painted on F.s., and Fr. F.s. of this period, painted on fine vellum, called 'chicken skin,' silk, etc., are highly prized. Charles Conder (q.v.) painted many exquisite silk F.s. There is a fine collection of F.s. of every age and country in the Victoria and Albert Museum, S. Kensington, London.

The design of a F. depends mainly upon the amount of air which it is required to move and the pressure against which it has to move it. F.s. for moving large volumes of air against very little pressure, such as ventilating F.s., have either large blades (about 3 ft. long) and revolve slowly, or small blades and revolve quickly. F.s. which have to compress or exhaust air against a pressure of two-inch water gauge or more are usually centrifugal and are constructed on much the same principle as the centrifugal pump. *Centrifugal* or *paddle-wheel* F.s. are those in which the impeller discharges air in a direction at right angles to the axis of the shaft. These F.s. are used for drying apparatus, forcing draughts for boilers, dust exhausting and the conveying of grain and other similar materials. The horse power of the motor required to drive the F. depends on its use; a small domestic F. only requires a motor of ½ h.p., but large forced draught blowers, such as are used in power-houses, require anything up to 50 h.p. To secure economy of power, the right type of F. must be chosen. For ventilation purposes a propeller F. should be used. *Propeller* or *air-screw* fans are those having impellers which discharge the air in a direction parallel to the driving shaft, the impeller being that part of the F. which in rotating imparts movement to the air. One of the most common uses of a F. is on the engine of a motor vehicle, where it is situated behind the radiator. Belt-driven from the crank-shaft, its purpose is to increase the efficiency of the cooling system by accelerating the flow of air through the radiator tubes. Where the air is sucked down a duct the duct should be at least of the same diameter as the F. blades, and sharp bends should be avoided in the ducts, but where sharp bends and small ducts have to be used, a centrifugal F. is the best.

Fan-bearer, see **FLABELLIFERA**.

Fanariots, descendants of the Gks. of noble birth who remained in Constantinople after its capture by Mohammed II. in 1453; so called from Fanar, the quarter in which they dwell; they rose at one period to great influence in Turkish affairs.

Fandango, Sp. dance, of Moorish origin. It is a mixture of the *seguidilla* and *bolero*, and is danced by two people, a male and female, to the accompaniment of the guitar and castanets, and sometimes the tambourine, the music being quick and lively, and played in triple time.

Fanfare (Sp. *fanfarria*), blast of trumpets, used at public ceremonies to announce the approach of a sovereign. It is used in Beethoven's *Fidelio*, in Wagner's *Lohengrin*, and in Schumann's 4th symphony.

Fanning, coral is. belonging to Britain, situated in the N. Pacific Ocean, and forming part of a group. It lies in lat. 3° 30' N., and long. 150° 13' W., and has an area of 15 sq. m. The name is derived from Capt. Fanning, an Amer., who discovered the group; the is. was annexed by Great Britain in 1888. F. together with Wash-

ington Is. 66 m. N.W. by W. of Fanning Is. were included in the Gilbert and Ellice colony by an Order in Council of Jan. 27, 1916. Pop. of both Is. (1938): 30 Europeans, employed on Pacific Cable Station; and 300 Pacific islanders in copra industry; and about 25 Asiatics.

Fano, tn. and seaport of Italy in the prov. of Pesaro e Urbino. It is situated on the Adriatic coast, 8 m. S.E. of Pesaro, and 29 m. N.W. of Ancona. There are the ruins of a white marble triumphal arch to Augustus, also a cathedral, which possesses valuable paintings. The manufs. are silk goods, bricks, etc., and a trade is carried on in corn and oil. In the Second World War the Gers., under the pretext of creating road blocks, mined and destroyed the bell-towers of five churches and the Vanvitelli tower of the Palazzo della Ragione. The churches, generally, escaped serious damage as also did the tn.; but in the church of S. Agostino, the painted ceiling by Ferdinando Bibbiena and frescos in the church of S. Domenico sustained some damage. Pop. 12,000.

Fano, an is. of the N. Frisian group, situated in the N. Sea, off the W. coast of Jutland. It belongs to Denmark, and has an area of 20 sq. m. The cap., Norby, is a summer watering place, and contains a school of navigation. The inhabs. are engaged in fishing and boating. Pop. 3300.

Fans, **Fangs**, or **Ba-Fan**, race of Aborigines, occupying the dist. between the Gabun and Ogowe rvs. in Fr. Congo, W. Africa. They are a cannibal race, with fine physique, woolly hair, and a chocolate complexion, lighter than that of the negroes. They wear practically no clothing, but tattoo their bodies and deck themselves in jewellery. The men are warlike, and good hunters; they are skilled in iron, brass, and copper work. They are believed to be moving westwards in large numbers. Cannibalism has diminished since their contact with civilisation, but their morals have deteriorated. See Mary Kingsley, *Travels in West Africa*, 1897, and Sir R. Burton, 'A Day with the Fans,' in *Transactions of the Ethnological Society* (vols. iii. and iv.).

Fanshawe, Sir Richard (1608-66), Eng. ambas. and poet, b. at Ware Park, Hertfordshire, and educated at Jesus College, Cambridge. He entered the Inner Temple in 1626, and afterwards travelled in France and Spain. Until 1638 he was secretary to the Brit. embassy at Madrid, and on the outbreak of the Civil War fought on the Royalist side. He became secretary to the Prince of Wales, and in 1648 naval treasurer under Prince Rupert. At the Battle of Worcester (1651) he was taken prisoner, but was released, and took refuge on the continent, returning to England at the Restoration. He died in Madrid, where he had been sent as ambas. in 1661. He trans. Guagnini's *Pastor Fido*, 1617; Camoens' *The Lusiad*, 1655; and wrote some original verse. See Lady F.'s *Memoir*, 1876 (pub. 1820).

Fantasia (It. signifying fancy, caprice) is the name applied to musical composi-

tions in which the composer follows his fancy, and is not bound down by fixed forms. A F., however, is not without form; it generally consists of sev. sections, each being independent of the others in form. It is frequently the case that one section interrupts a previous one, and often a brilliant cadenza is used; but the whole is united. An example of this is to be seen in Mozart's F. in D minor. The student of music should examine variations in the Fs. by Mendelssohn, Mozart, and Schumann.

Fanti, name of a negro tribe of the Ishl group inhabiting the Gold Coast, W. Africa. In the early nineteenth century the Fs. were subjugated by the Ashantis, a race belonging to the same stock as themselves, and have since accepted Brit. protection. Missionaries have been sent out to them by Wesleyan Methodist and Swiss societies. They fought on the side of the Brit. in the Ashanti War (1817-74), but although of strong physique, proved cowardly allies. See A. B. Ellis, *The Tshi-speaking People of the Gold Coast*, 1887; and Sir H. Brackenbury and G. Hnyshé, *Fanti and Ashanti*, 1873.

Fantin-Latour, Ignace Henri Jean Théodore (1836-1904), Fr. artist, b. at Grenoble, the son of a pastel painter. He studied under Couture, and first exhibited in the Salon in 1861. He moved in the artistic circles of Paris and London, and numbered among his friends Corot, Delacroix, Courbet, and Whistler. His 'Hommage à Delacroix' is a portrait group containing Whistler, Beaudelaire, Legros, Champfleury, and himself. His other notable portrait groups are 'Un Atelier à Batignolles,' 1870; 'Un coin de table,' 1872; and 'Autour du Piano' 1885. He also exhibited some fine lithographs, and some beautiful paintings of still life. See *Times* by G. Hédard, 1906; A. Julien, 1909; G. Kahn, 1926.

Fantoccini, see **MAISONNETTES**.
Fan-tracery Vaulting, in architecture, a method of vaulting employed in the Perpendicular style, and so called on account of its resemblance to a fan. The ribs radiate from one point in the same curve, and are equidistant, terminating at the apex of the ceiling. The intermediate spaces between the ribs are generally filled in with smaller ribs and with decorative ornaments which give it the name of *fan-tracery*. The ceiling of Henry VII.'s chapel in Westminster Abbey is one of the most wonderful achievements of architecture. Other fine examples of this kind of vaulting may be seen over the staircase of Christ Church, Oxford, and in the cloisters at Gloucester and Canterbury.

Fantuzzi, anct. It. family the members of which were natives of Bologna:

Giovanni Fantuzzi, called the Elder (d. 1391), lawyer; held sev. important posts in Bologna.

Giovanni Battista Fantuzzi, doctor of philosophy, wrote a book on peripatetic philosophy, 1536.

Gaspario Fantuzzi (d. 1532), Lat. scholar.

Giovanni Fantuzzi, the Younger (d. 1646), was prof. of philosophy in the Univ.

of Bologna, and a member of the corporation called 'Gli Antichi.'

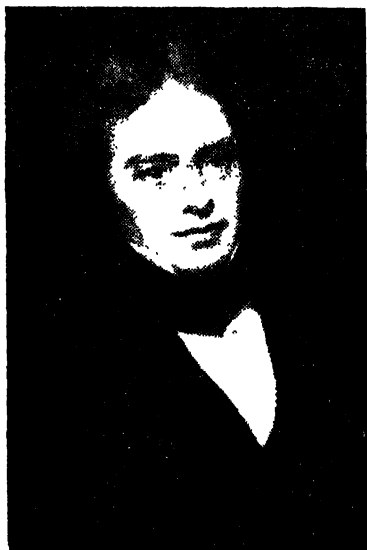
Paoletto Fantuzzi (d. 1661), poet and senator. A collection of his lyric poems appeared in 1647.

Giovanni Fantuzzi, scholar of the eighteenth century; pub. an important work on the literary hist. of Italy (1781-1794).

Fanu, Joseph Sheridan Le, see LE FANU.

Farad, name derived from Michael Faraday, given to the unit of electrical capacity, i.e. the capacity of a body which, when raised to a potential of one volt, has a charge of one coulomb or unit quantity of electricity. It is divided into a million *microfarads*, one microfarad being equal to 10^{-18} of a C.G.S. unit.

Faraday, Michael (1791-1867), distinguished Eng. natural philosopher,



MICHAEL FARADAY
A painting by Thomas Phillips

chemist, and electrician, b. at Newington Butts, near London, his father being a blacksmith. He was early apprenticed to a bookbinder, but all his spare time was devoted to scientific reading and experiment to the best of his opportunities. He managed to attend some lectures by Sir Humphry Davy, and in 1813 the great scientist took his case in hand, and made him an assistant in the laboratory of the Royal Institution. He then travelled for some time with Davy on the Continent, and on his return devoted himself to chemistry, in which study he greatly assisted Davy in many ways. In 1827 he

succeeded his benefactor as prof. of chemistry in the Royal Institution, and in 1832 he was made D.C.L. From this period he continued his work not only on chemistry, but also on the manuf. of glass for optical purposes, and the study of electricity and magnetism. Among his extremely numerous discoveries may be named those of the condensation of gases into liquids by pressure (1823), the decomposition of hydrocarbons by expansion (1827), electro-chemical decomposition (1834), magnetic rotary polarisation (1845), and various later researches in connection with diamagnetism. In 1829 he commenced a series of Christmas lectures at the Royal Institution, which were primarily addressed to young people. They found, however, a much wider audience. F.'s publs. are numerous, the most important being: *Experimental Researches in Electricity* (1839-55), *Chemical Manipulation* (1827, 2nd ed. 1842), *Lectures on the Non-metallic Elements*, and *Lectures on the Chemical History of a Candle* (1861). See J. Tyndall, *Faraday as Discoverer*, 1868; B. Jones, *The Life and Letters of Faraday*, 1876; and lives by J. H. Gladstone, 1872; W. Jerrold, 1891; S. P. Thompson, 1898; W. Ostwald, 1924.

Faraday's Law, see ELECTRICITY.

Faradisation, application for medical purposes of a faradic current of electricity. Whereas a galvanic current is continuous, a faradic current is interrupted, the interruptions occurring regularly. Both kinds are used diagnostically and therapeutically; in the former case faradism being used for the diagnosis of nervous and muscular disorders, in the latter in cases of general exhaustion, acute articular rheumatism, etc.

Farāizi, Muslim sect formed in Bengal during the nineteenth century to check the abuses into which the Mohammedan Church had fallen. Its adherents base their doctrines and rules of life solely on the Koran.

Farazdag (nickname; real name, Abu Firas Hammām ibn Ghālib) (c. 642-c. 732). Arabian poet, b. at Basra. His nickname means The Fat. His writings are chiefly satirical—written against people in Basra. He had to flee—first to Kufa, then to Medina, whence he was expelled by the Khalif for licentiousness. He was permitted to return to Basra, where he died. See J. Hell, *Das Leben des Farazdag*, 1903.

Farce (It. *farsa*, from Lat. *farvere*, to stuff), form of dramatic art which makes no pretence of holding the mirror up to nature, aiming at exciting laughter by means of absurd situations and extravagant buffoonery. While the province of comedy is to reveal the humorous interplay of character upon character, and that of burlesque is to caricature some particular fashion, style, or human type, the object of F. is solely to amuse. Rude pantomimes and Fa. prevailed in very early times among the Gks. and Roms. It exists in the primitive drama of all nations. *Gammar Gurton's Needle* is an early form of Eng. F., which, in the hands of Shakespeare, developed into true comedy.

Farciennes, tn., Hainaut, Belgium, 6 m. E. of Charleroi, with coal and metal industries. Pop. 10,700.

Farcy, outward manifestation of glanders, a contagious disease that attacks horses. It takes the form of ulcers or F. buds which appear on the limbs. See HORSES—DISEASES.

Far Eastern Area, Khabarovsk Ter. of Asiatic Russia, of some 630,000 sq. m., extending along the Siberian coast of the Pacific to the Arctic, including Kamchatka (q.v.) and is. of the Sea of Okhotsk and Sea of Japan. The surface is mountainous and covered with forests or tundra in the N. The Yablonoi and Stanovoi Mts. extend along the entire length of the area diagonally from S.W. to N.E. The total forested area is 900,000 sq. km. and constitutes one of the most important natural resources. The Amur and Anadyr are the chief rivs. The climate is severe. The inhab. include Chukches, Koriaks, Itinguses and others and total some 275,000. Furs (chiefly sable) and fish abound. Coal is found, and gold on the Amgun Riv. Agriculture and cattle-breeding are being developed in Kamchatka and there are sev. large state collectivist farms. Most of the pop. in the Vladivostok area is engaged in agriculture, industry (chiefly wood-working and flour-milling), and transport. A railway runs from Khabarovsk (or Habarovsk) the cap., to Grahskaya and Vladivostok (cap. of the S. Utri dist.) the most important tn.

Far East Campaigns in Second World War, see PACIFIC CAMPAIGNS.

Farham, mrkt. tn. of Hampshire, England, 5 m. N.W. of Portsmouth. The industries include the manuf. of bricks, earthenware, leather, and ropes. There is a flourishing trade in corn and timber, but F. owes its prosperity largely to its proximity to Portsmouth. Pop. 11,500.

Farel, Guillaume (1489-1565), Fr. reformer, b. near Gap in Dauphiné, France. He studied in Paris, where he was converted from being an ardent Rom. Catholic into an equally ardent Protestant and promoter of the Reformation. He preached with vehement fervour throughout France and Switzerland and made many converts. His friend Calvin was the organiser, while he was the preacher, of the Geneva Church (1535-38) until the two reformers were expelled from the city. He wrote some polemical works on purgatory (1534) and the Lord's Supper (1555). See lives by Ancillon (1691) and F. Bevan (1893).

Farwell Cape, S. extremity of Greenland, situated by the E. entrance to Davis Strait. It is seldom visited on account of the dangerous currents.

Fargo, largest city of N. Dakota, U.S.A., cap. of Cass co., on the Red R. of the N. It is the seat of the N. Dakota Agric. College, a busy grain-trading centre and distribution point for farm implements. There are some fine parks. Pop. 32,500.

Faria y Sousa, Manuel de (1580-1649), Portuguese historian and poet. The work of his life was a compilation of a hist. of the Portuguese in all parts of the world,

but it was never completed, although sev. vols. appeared after his death, *Europa Portuguesa* (3 vols.), *Asia Portuguesa* (3 vols.), *Africa Portuguesa*. His sonnets and eclogues are mostly contained in *Noches claras* (Madrid), 1621-26, and the *Fuente de Aganipe*.

Faribault, co. seat of Rice co., Minnesota, U.S.A., on the Cannon R., 52 m. from St. Paul by rail. It is the seat of the state schools for the deaf, the blind and the mentally defective. It lies to the S. of the beautiful S. Minnesota lakes and has various manufs. Pop. 14,500.

Faridkot, tn. and native state of India in the Punjab. The tn. has a railway station and is 84 m. from Lahore. During the Sikh wars in 1845, the Raja of F. exerted himself in the Brit. cause, as did also his son in 1857 in the Mutiny. Pop. (dist.) 130,000.

Faridpur, tn. and dist. of India in E. Bengal. The tn. stands on the Ganges, and has a railway station and a gov. high school. The dist. has an area of 2300 sq. m., and is flat and uninteresting, and the climate is damp. Rice is the prin. crop. Most of the trade is conducted by riv., although the E. Bengal Railway to Calcutta crosses the dist. Pop. (tn.) 11,700; (dist.) 2,000,000.

Faridu'd-Din 'Attar, Persian mystic and religious poet of last half of twelfth and beginning of thirteenth century A.D. There is no certainty as to the precise period of his life. He wrote *Mantiqut-Tayr*: i.e. Speech or Parliament of Birds—a long mystical and allegorical poem. His *Madharu'l-'Adab* (Manifestation of Wonders) caused his expulsion from Nishapur. He afterwards lived chiefly in Mecca, where he produced inferior work. Another extant work is trans. as *Book of Good Counsels*. F. is said to have perished in the invasion of Persia by the Mongols under Genghis Khan.

Faridun, or **Faridoun**, in Persian legend, an Iranian king, one of the chief heroes of the Shahnamah. He was the son of Abtin and Firanak, and the story goes that on his birth he was sought out by Tohak, whom he was destined to dethrone. Abtin was killed, but Firanak escaped with Faridun and reared him in Mt. Alburz, and when he grew up he overthrew Tohak, captured his cap. on the Tigris, and ruled long and prosperously.

Farigoule, Louis, see ROMAINS, JULES.

Farina, Johann Maria, inventor of the celebrated perfume, Eau de Cologne (q.v.).

Farina, Salvatore (1846-1918), It. novelist, b. Jan. 10 in Sardinia. He began by studying law, but afterwards devoted himself to literary work and settled at Milan. His many books, which are written in a simple style, are remarkable for their sentimental humour (in this F. has been compared with Dickens) and their cunning irony. His masterpiece is *Il Signor Jo* (1880).

Farinacci, Roberto (1893-1945), It. politician, born of working class stock in N. Italy; became a railway worker in his native Cremona, then one of the chief centres of Socialism; educated himself in the law and rapidly rose to local

eminence. Joined the Fascist movement and created a strong Fascist Party in Cremona. Anticipated the march on Rome by seizing the city before Mussolini's Blackshirt columns could reach the cap. In 1924 he was made secretary of the Fascist Party and soon exceeded his predecessors in violence. One of his victims was the ex-minister and editor Amendola. For two years he ran the political machine of the Fascist Party and then was suddenly dropped for no stated reason; but after two years' exile from power he was brought back into active life by being made a minister of state. In his newspaper, the *Regime Fascista*, he became one of the best-known Fascist publicists, adopting an extreme pro-Nazi attitude. A strong supporter of Imperial expansion, he volunteered for service in Abyssinia and fought through part of a campaign. In the Second World War he fought in Albania as commander of the Blackshirt battalion. He escaped the purge of the Fascists and remained one of Mussolini's most violent supporters, but was executed in 1945 following the defeat of the Ger. armies in Italy.

Farinaceous Foods, are those which contain starch. The word 'farina' means literally meal or flour formed from grain, when ground, and consists, therefore, of starch, gluten, etc., but it is generally now applied to the farinaceous matter contained in other vegetable products, such as the potato, when it consists almost entirely of starch or fecula, or beans and peas, etc. Among the many F. F., sago, arrowroot, and tapioca are types of the large class of dried foods which are imported into the country, and these consist practically of pure starch and are very nutritious when cooked with milk. Maize, too, though not yet regarded as a food for human beings, has very considerable nutritive qualities, since it contains more carbon and nitrogen than is found in an equal weight of wheaten flour, besides a considerable quantity of free hydrogen, which is found in the fat, a substance in which the grain is somewhat rich. Besides this, it exceeds all other grains in point of economy, but the great objection to its use is its rough taste. It has, however, been used by the poor of Ireland since the potato famine, and in the W. part of America. F. F. give heat and energy to the body, but are not flesh formers although very often an excess of such foods is stored up as fat.

Farinati, Paolo (c. 1522-1606), It. painter of the family of the Uberti, b. at Verona. He was a pupil of Niccolò Giolino and A. Badile, but studied also the works of Parmigiano. He formed his style partly on Titian and Giorgione, although in colouring he is inferior to both, but in form he learned more from the works of Giulio Romano. Of his pictures 'The Multiplication of the Loaves' is generally considered to be his best. His other notable works are: 'A Presentation in the Temple,' 'The Marriage of St. Catherine,' 'The Murder of the Innocents.'

Farinelli (1705-82), Neapolitan singer of great eminence, whose real name was

Carlo Broschi, b. at Naples. He studied under Porpora, and went from Rome to Vienna, where the Emperor Charles VI., who delighted in accompanying him on the harpsichord, loaded him with presents. In 1734 he came to England, and so delighted his audiences with his singing that Handel was obliged to dismiss a rival company over which he presided. From England he went to Spain, where he remained twenty-five years, and was much appreciated by Philip V. and his son Ferdinand VI., both of whom suffered from chronic melancholia.

Farlingdon ('fern hill'), or **Great Farlingdon**, mkt. tn. in the Abingdon parl. div. of Berkshire, England. It has trade in corn, sheep, and cattle, and is interesting for its church of All Saints, a large cruciform building of the Early Eng. period, and for Farlingdon House, built by Henry James Pye (1745-1813), the poet. Pop. 2700.

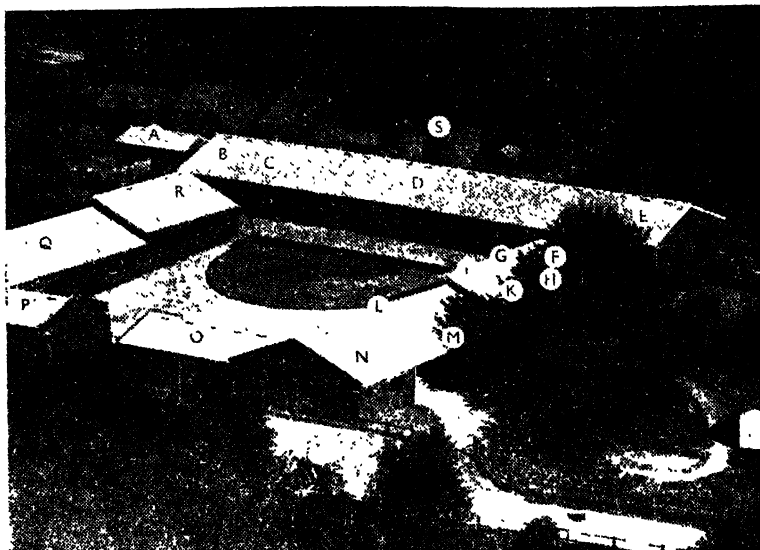
Farington, Joseph (1747-1821), Eng. artist and diarist. He executed many engravings of scenes in the Eng. Lake Dist. His interesting diary was first pub. in 1921-22.

Farini, Luigi Carlo (1812-66), It. statesman and historian. In 1861 he became minister of the interior in the last ministry of Cavour, whom he succeeded as Premier, 1862-63. His chief pub. was *Il Stato Romano* (4 vols., 1850), partly trans. by Gladstone. See his letters to Gladstone in *Mémoires sur les Affaires d'Italie* 1859: *Lettres sur les Affaires d'Italie* (Paris), 1860; and E. Parri, *Luigi Carlo Farini* (Rome), 1878.

Farm (Fr. *ferme*, from medieval Lat. *firma*, fixed payment), term used to denote a piece of land let or rented for cultivation or pasturage, together with the necessary buildings. The term 'farmer' is often used to denote a man who owns as well as cultivates land. In America the farmer generally owns the land he cultivates. **Farm holdings** consist of the residence for the farmer and his family, cottages for the F. labourers, and the F. steading. The dwelling-house varies to some extent with the size and character of the holding, the 'rules of the estate,' the fashion of the dist., and the taste and social standing of the tenant. Modern F. dwelling-houses upon holdings of about 200 acs. and upwards are both commodious and comfortable, substantial in construction, if not ornate in external appearance, usually surrounded by simply but tastefully laid-out grounds and a moderately sized garden. The dwelling-house should be 50 to 200 yds. from the steading, and preferably upon higher ground, and so situated that from the farmer's parlour and bedroom windows the whole homestead can be seen. **Servants' cottages** should be near the homestead at the opposite end from the farmer's dwelling-house. They should be plain, substantial, and roomy. They are often built in one continuous row, and sometimes in pairs but rarely singly. Each family should have three or four compartments, with a separate door and a separate garden for garden produce. At the present time they

are more fully provided than they were before 1870. It is usually found that where there is good accommodation for the labourers, the supply of agric. labour is abundant and of good quality. The *farm steading* is the term used to denote the buildings, etc., used for storing crops, stock, F. implements, and machines. The cost, character, and capacity of the steading depend on the size of the holding, the system of farming pursued, and also with

The most common and convenient plan for a F. steading is in the form of three sides of a square, with a wing down the centre. In most modern farmsteads the spacing between centre and side wings is devoted to courts for cattle, and most of the season's dung is placed in one of these courts. Straw barns should be near the centre of the steading and the classes of stock receiving most straw accommodated nearest to the straw barn. Root store



*Photo by Airscenes and Frank H. Meads, Essendon.
by courtesy of Brig. W. H. Crosland, C.B.E., D.S.O., T.D., D.L., J.P.*

A NEW FARM AT LITTLE BERKHAMSTED, HERTFORDSHIRE

A, Bull boxes and yards; B, calf pens, C, mixing room; D, cowhouse; E, dairy and sterilising room; F, office and staff room; G, foaling box; H, saddle room; I, calving box; K, stable; L, loose boxes; M, tractor shed; N, tool room; O, implements; P, implements; Q, stock pens and cattle shelters; R, granary; S, silos. Built by George W. King Ltd., Hitchin (architect, L. A. Hartless).

the tastes of the landowner, and sometimes with the fancies of the tenant. They often are determined by the 'rules of the estate.' The greatest steading accommodation is wanted on mixed husbandry Fs., and also where a large quantity of home-grown produce is consumed by cattle in winter. Unfortunately on such a F. the maximum expenditure falls where the land is least able to bear it, viz., in cold dists. such as N. of Scotland, where substantial houses have to be built for harbouring the stock in winter. The F. steading should be situated as near as possible to the centre of the holding, on dry and airy elevation. There should be an abundant water supply, and proximity to stagnant water should be avoided. The open part should be exposed to the S.

should be easily accessible from the cattle compartments; hay store from the stable; dairy from the cow-house, and stock-yard from the threshing mill and straw barn. *Ventilation.*—Careful attention is needed in ventilating the whole of the steading. A sufficient current of air is needed overhead to keep the atmosphere pure without draughts upon the animals. Concrete is largely used in the construction of F. buildings, while galvanised corrugated sheet-iron is largely used in roofing courts for cattle. In America F. buildings are generally of wood. It is common there for all compartments of the steading to be under one roof of great dimensions. A prominent feature of the most modern Fs. is the extensive use of machinery, often electrically operated, for

such tasks as milking, haymaking, and the cutting, grinding, and crushing of food for stock. Motor power has largely superseded horses for transport and tillage.

In Britain to-day our cottages are out of date and farm buildings still more so. Thus, in some cases it will be found that the large barn was really designed for the use of the flail. Again, there are stables which were erected over a century ago, and the greater part of the buildings were ox stables, built to house the teams which worked the land in those days. Fire is an ever-present danger where electricity and internal combustion engines are used in old buildings close to wood and thatch. The barn entrance was quite convenient when horses in shafts could back a load to its destination; but a tractor or trailer, carrying a big load, is not so easy to manoeuvre. Much labour and energy are wasted in carrying sacks of corn and artificial manures on men's backs. Every well-organised F. should grow some corn and use some artificial manures. Hence storage barns are necessary and they should have doors at both ends, be dry and rat-proof, and down the centre should be a carriage way to enable a tractor to load, drive in at one end, unload and drive out at the other. Implement sheds should be designed on the same principle, especially as tractor machinery is so much bigger and heavier than the old horse machinery. Between the two World Wars a number of new cow-sheds have been built. To secure a licence to produce milk for sale, the law requires a certain standard. In some cases landlords found it cheaper to build a new shed rather than convert an old one, but often no advice was taken to ensure that the design was sound and owing to faulty design the result may be that cows crowd at the entrance and it is difficult to get each animal into her proper standing. Progressive milk farmers, in order to obviate waste of time between milkings on washing down the sheds, prefer to have a milking parlour which will accommodate about twice the number of cows usually milked at a time, combined with covered yards divided into pens, so that no more than a dozen cows lie together for the night. At present (1949) there are not enough houses of any sort to go round. A number of decisions must be made when the time comes for rehousing those labourers who earn comparatively high wages. Stockmen and those in authority must live close to their work. Hence most of these houses must be built close to the F. buildings where the men find employment. The rest of the staff on a F.—the day-men and the tractor drivers—need not live on the spot when motor bicycles and small cars are within their means. Tied and service cottages are required. A cowman must live near his cows and the shepherd near his flock. Beyond that, there is no need for this type of cottage provided there is sufficient accommodation within range of the F. for those who work on it but who need not be at the beck and call of animals. See F. Sykes, *This Farming Business*, 1944; M. E. Seebohm, *The Evolution of the*

English Farm, 1927; D. R. McHardy, *Modern Farm Buildings*, 1932; E. Gunn, *Farm Buildings—New and Adapted*, 1945. See also AGRICULTURE; DAIRYING; GARDENING.

The study of farm management in the United States, where farms and ranches attain a vast size unknown in Great Britain, has become of such importance that chairs in this subject were established in various universities during the early part of the twentieth century. Experience and research have now furnished data for instruction in F. M. In the univ. are taught the best and most profitable methods of producing field crops and livestock; soil and climatic conditions are studied; the relative merits of various forms of farm implements and equipment are analysed; the problems of labour are discussed; a certain amount of accountancy is taught in order that farm accounts may be properly kept; and the marketing of produce is a feature of the student's course. See R. L. Adams, *Farm Management*, 1921; L. A. Moorhouse, *The Management of the Farm*, 1925; F. App, *Farm Economics, Management and Distribution*, 1928; K. W. Campbell, *Farm Management*, 1940; J. Scott Watson and J. More, *Agriculture: The Science and Practice of British Farming*, 1945.

Farman, Henry, Anglo-Fr. aviator, b. 1874 at Cambrai. One of the pioneers in aviation. In Oct. 1907 he flew 820 yds. in 52½ secs., and in the same month of the following year journeyed in the air from Châlons to Rheims, covering a distance of 16 m. in 20 mins. This was the first cross-country flight, and was accomplished in a Voisin biplane, improved after the pilot's own designs. The speed attained was 78 kilometres per hour. F. was the first man to fly to New York. During the First World War, his works at Billancourt supplied aeroplanes to allied forces.

Farmer, Richard (1735-97), Eng. scholar and critic, b. at Leicester and educated there, and at Emmanuel College, Cambridge, of which he became classical tutor and master in 1775. In 1773 he became chief librarian to the univ.; in 1780 he was appointed to a prebendal stall at Lichfield, and two years later to one at Canterbury, which he exchanged in 1788 for that of a canon residentiary of St. Paul's. He twice declined the offer of a bishopric made to him by Pitt in recognition of the Tory principles he strove to propagate in Cambridge University. He called himself the 'pioneer of commentators' and in his *Essay of the Learning of Shakespeare* (1767), his only work of any importance, proved that the dramatist derived his knowledge of classical and foreign literature from trans.

Farmers' Clubs exist for the twofold purpose of furthering agric. interests and promoting social intercourse among men who are following the same agric. occupation. Meetings take place usually on market days, in most of the big agric. centres throughout the country. The Farmers' Club, estab. at 2 Whitehall Court, London, S.W. 1, has a large membership of farmers, stockbreeders, landowners,

and other persons interested in agriculture. It was estab. in 1843 at the instance of sev. members of the Royal Agric. Society of England and the Smithfield Club. Meetings are held annually there when papers are read on current agric. subjects and on legislation affecting agriculture. The National Association of Young Farmers' Clubs has its headquarters in 26 Bedford Square, London, W.C. 1, where is pub. the monthly paper *The Young Farmer*. The first of the Young Farmers' Clubs was estab. by the United Dairies in Jan. 1921, at Hemvock, Devon, and attracted the interest of Lord Northcliffe, who set aside a section of the Ideal Homes Exhibition at Olympia for their show in 1922, and offered a gold cup for competition among the young farmers of America and of Britain. Later the Ministry of Agriculture interested itself in clubs, in which each young farmer personally rears his own stock. F. Cs. are a feature in the U.S.A., and of Canada, especially in the three prairie provs. of the dominion. There are also in the U.S.A. a number of boys' and girls' clubs in connection with agric. extension work. In America, experimentation, improvement in marketing, discussion of anti-pest methods, and the organisation of co-operative marketing are all prominent activities in F. Cs., while demonstrations in educational work and agric. competitions are periodically organised for the common benefit of members.

Farmers General (ancient Rome), see **PUBLICANI**.

Farmers-General, those individuals who sought from the state or controller of taxes the privilege of collecting the taxes in return for a certain fixed sum paid into the treasury, such as the 'publicani' of classical and N.T. times. The system of *fermiers-généralux* was very prevalent in France before the Revolution of 1789. It was largely responsible for the Revolution, and was swept away in it.

Farm-servants, see **LABOURERS**.

Farnaby, Giles (c. 1560-c. 1600), Eng. composer, b. probably at Truro, Cornwall. He lived in London where he married in 1587, and took the Mus. B. at Oxford in 1592. He composed pieces for voices (madrigals) and over fifty virginals.

Farnaby, or Farnable, Thomas (c. 1575-1647), Eng. grammarian and schoolmaster, the son of a London carpenter. He was educated at Merton College, Oxford, and at a Jesuit College in Spain. He was for some time a follower of Drake and Hawkins and fought in the Low Countries. On his return to England he opened a school in Goldsmith's Rent, London, which became famous all over Europe. He was the chief classical scholar as well as the chief schoolmaster of his time. He prepared a new Lat. grammar and an annotated ed. of most of the great classical authors, and these elaborately annotated eds. were extraordinarily popular throughout the seventeenth century. Ben Jonson was a friend of F. and contributed commendatory Lat. elegies to his ed. of *Juvenal and Persius*. John Owen eulogises F.'s Seneca in his 'Epigrams.'

Farnborough, urban dis. and part of Hampshire, England, situated in the Haslingstoke par. div., 2½ m. N. of Aldershot, and 32 m. S.W. of London. A part of the Aldershot camp is in the par. and also an aerodrome. The remains of Napoleon III. and the Prince Imperial are buried in a mausoleum built by the ex-Empress Eugénie at F. Hill. Pop. 16,000.

Farnborough, Baron, see **MAY, SIR THOMAS ERSKINE**.

Farne, Fearn, or Fern Isles, or **The Staples**, group of about 30 small is., in the N. Sea, in lat. 55° 38' N. and long. 1° 37' W. They belong to Northumberland, England, and are from 1½ to 7 in. off the coast, 20 m. S.E. of Berwick, 3 m. S.E. of Holy Is. Noted as a breeding place for sea birds and Atlantic seals. Here Grace Darling's heroic rescue took place in 1838; in 1843 sixty people from the *Pegasus* were drowned. Two lighthouses stand upon the largest of the is., and upon this also is St. Outhbert's tower, the remains of a Benedictine priory. The is. were acquired by the National Trust in 1925, as a result of a public appeal.

Farnese Family, The, illustrious and powerful It. family whose early hist. is obscure. Its importance dates from 1534, when Cardinal Alessandro Farnese was elected pope as Paul III. He alienated the duchy of Parma and Placentia for his natural son Pierluigi Farnese. Placentia was occupied by Charles V. in 1547, but the duchy of Parma was ruled by the Farnese for over two centuries. **Alessandro Farnese** (1545-92), the third duke of Parma, was a famous statesman and general, and became governor-general of the Netherlands under Philip II. of Spain. His son and successor, **Ranuccio I.** (1569-1622), instituted the savage persecutions against supposed 'witches' and 'heretics.' He was succeeded by his second son, **Odoardo** (1612-46), who quarrelled with Pope Urban VIII. about the possession of Castro, which was eventually razed to the ground during the reign of his son **Ranuccio II.** (1630-94). Ranuccio's two sons **Francesco Maria** (1678-1727), and **Antonio** (1679-1731) both died childless and were the last of the male line of the Farnese. The duchy of Parma passed to Don Carlos of Bourbon, son of Philip V. of Spain and Elizabeth Farnese (1692-1766).

Farnese Palace, in Rome, one of the finest specimens of Rom. Renaissance architecture. It was begun under Paul III. when he was Cardinal Alessandro Farnese, and completed by his nephew in 1586 under the direction of Michelangelo. It was inherited by Don Carlos, afterwards King of Naples and Spain, and most of the pictures and antique sculpture were removed to Naples. It now houses the Fr. embassy to Italy.

Farnham, mkt. tn. of Surrey, England, situated on the R. Wey, 38 m. S.W. of London. It is the centre of a hop dist. Wm. Cobbett was born here in 1762, and is buried in the par. churchyard. F. is historically interesting. Its castle was built by Henry of Blois, brother of King Stephen, destroyed by Henry III. and rebuilt and garrisoned by Charles I. It

was restored in 1684 by Dr. Morley, bishop of Winchester. The ruined keep was repaired in 1913-14. Moor Park was the last retreat of Sir Wm. Temple, who died here on Jan. 27, 1699, and it was here that Dean Swift wrote many of his works. The cottage in which Miss Johnson lived is still called *Stella's Cottage*. Mother Ludlam's and Foot's caves are near by, also the remains of earth-works called Caesar's Camp. Many Rom. coins have been found. Pop. 18,200.

Farnol, John Jeffery (b. 1878), Eng. novelist. Studied engineering, but, after a course of art study, began writing fiction for Eng. and Amer. magazines. For two years he worked as a scene-painter at the Astor Theatre, New York. His great success was 'The Brood Highway', a study of Eng. rural characters in the heroic vein of the old-time workers. Other novels of the same picaresque genre: *Bellane the Smith* (1915), *The Money Moon*, *The Amateur Gentleman*, *Chronicles of the Imp* (1916), *The Loring Mystery* (1925), *The Jule of Destiny* (1931), *The Way Beyond* (1933), *The Crooked Furrion* (1937), *Murder by Nail* (1942), *My Lord of Wrybourne* (1944).

Farnworth, tn. of Lancashire, England, situated on the R. Irwell, in the Radcliffe-cum-Farnworth par. div., 2½ m. S.E. of Bolton and adjoining it; it is also 12 m. N.E. of Liverpool. There are collieries, iron works, tile and brick fields in the dist., and the manuf. of cotton goods and sail canvas is carried on. Pop. 27,300.

Faro (from 'Pharaoh,' a picture of an ant. Egyptian king on one of the cards of the old Fr. pack), a game of hazard with a full pack of cards, popular in France in the reign of Louis XIV. and still in the U.S.A. The 'bank' is held against an indefinite number of players.

Faro, seaport tn. of Portugal, cap. of the dist. of the same name, in the prov. of Algarve. (1) The tn. is situated at the mouth of the Rio Vermoso, at the back of three is., which help to form a fine roadstead. It is the chief port of S. Portugal, and exports fruits, wine, anchovies, cork, etc. A wall surrounds the tn., built probably by the Moors, and there is a cathedral, which is supposed to have been a Rom. basilica. There is an arsenal and military hospital, with sev. educational estab. and convents. F. was almost destroyed in 1755 by an earthquake. Pop. 13,000. (2) The dist. has an area of 1936 sq. m. Its climate is extremely fine, and almonds, dates, figs, wheat, olives, etc., are grown. Pop. 317,600.

Faro Islands, see FAROE.

Farquhar, George (1678-1707), Irish dramatist, went on the stage after leaving Trinity College, Dublin, and in that city, about 1695, made his debut as Othello. He is generally supposed (on the authority of his biographer, Thos. Wilkes) to have left college in 1695 on account of the death of his patron, Bishop Walsman of Dromore, to become a corrector of the press. In a subsequent appearance he accidentally stabbed a fellow-actor, and was so distressed that he retired from the stage, though from all accounts he suffered from

stage fright and failed as an actor. He now turned his thoughts to play-writing, and his *Love and a Bottle* was successfully produced at Drury Lane in 1699. In the following year *The Constant Couple* was performed, and was an even greater success. This was followed by *Sir Harry Wildair* (1701), and in this play at his own benefit at Dublin he played the title-role. *The Inconstant*, or *The Way to Win Him* (1702), *The Twin Rivals* (1702), and *The Stage Coach*, a farce in one act (with Motteux), (1704). His last plays were *The Recruiting Officer* (1706) and *The Beaux' Stratagem* (1707). He got into financial difficulties and the duke of Ormonde, whom he styles his 'general' in the dedication to *The Recruiting Officer*, advised him to sell the lieutenant's commission which he then held, in order to pay his debts, promising to give him a captaincy. He acted on this advice, but the duke failed him and F. sickened and died in despair. He belonged to the Congreve school of dramatists, and had some wit and gaiety in abundance, but no higher sense of morality than the majority of his contemporary playwrights. See W. Connelly, *Young George Farquhar*, 1918.

Farr, William (1807-83), Eng. statistician, b. at Kenley in Shropshire. He studied medicine in Paris and London, but gave up the practice of his profession to accept the post of compiler of abstracts in the registrar-general's office. In 1851 and 1861 he was assistant-commissioner, and in 1871 head commissioner for the census. His chief pub. are: *Tables of Lifetimes, Annuities, and Premiums* (1861), *English Reproduction Table* (1880), and *Vital Statistics* (1885).

Farragut, David Glasgow (1801-70), first admiral of the United States navy, b. at Knoxville in Tennessee. He entered the navy in 1810, became lieutenant in 1825, commander in 1841, and captain in 1855. Although a Southerner by birth, on the outbreak of the Civil war in 1861, he adhered to his allegiance to the gov. at Washington, and in 1862 was appointed as rear-admiral to the command of the W. Gulf Blockading Squadron, with which he forced the passage of the Mississippi and captured New Orleans. In 1861 he captured Mobile and in the same year was invested with the newly created rank of vice-admiral, on which he retired from active service. He was made admiral in 1866.

Farrand, Livingstone (1867-1939), Amer. anthropologist and psychologist; from 1893 till 1901 he was instructor in psychology at Columbia Univ. He was from 1901 till 1903 adjunct prof. of psychology at Columbia; and then, until 1914, professor of Anthropology at same univ. Appointed by Rockefeller Foundation to direct work in France against tuberculosis. From March 1919 till Oct. 1921 was chairman of central committee of the Amer. Red Cross. In 1921, elected President of Cornell Univ. Wrote: *Basis of American History*, 1904.

Farrant, Richard (fl. 1564-80), Eng. composer of church music. He became a gentleman of the Chapel Royal under

Edward VI.; became organist of St. George's Chapel in 1564, and returned to the Chapel Royal in 1569. His name is best remembered in connection with the anthem, 'Lord, for Thy Tender Mercy's Sake,' and a chant based on it, but the authorship has not been satisfactorily established, being claimed for John Hilton.

Farrar, Frederic William (1831-1903), Eng. divine, b. at Bombay, and educated at London Univ. and Trinity College, Cambridge. From 1855-70 he was assistant master at Harrow, and from 1871-76 headmaster of Marlborough College. He was elected fellow of the Royal Society in 1864, univ. preacher in 1868, honorary chaplain to the queen in 1869, and Hulsean lecturer in 1870. He became canon of Westminster and rector of St. Margaret's in 1876, archdeacon in 1883, and Dean of Canterbury in 1895. In 1858 he began his literary work with the schoolboy story, *Eric, or Little by Little*, followed by *Julian Home* (1860), and *St. Winifred's* (1883). He pub. a number of books on classical and modern philology, but it was by his theological writings that he attained his greatest popularity. *The Witness of History to Christ* (Hulsean Lectures) appeared in 1870. Other works include: *The Life of Christ* (1874, 12th ed. 1875), *Life of St. Paul* (1879), *Early Days of Christianity* (1882), *Lives of the Fathers* (1888), *Darkness and Dawn* (1889), and *The Bible, its Meaning and Supremacy* (1896).

Farrar, Geraldine, Amer. operatic soprano; b. Feb. 28, 1882, at Melrose, Mass.; daughter of Sydney F., storekeeper. She received musical education from Mrs. J. H. Long in Boston, Mine. Thursty in New York, Trabadello in Paris, and Lilli Lehmann in Berlin. On Oct. 15, 1901, she made her debut at the Royal Opera, Berlin, as Marguerite in Gounod's *Faust*, with such success that she immediately had a three years' contract. From 1906 till her retirement from the stage on April 22, 1922, she was a leading soprano at the Metropolitan Opera House, New York. She appeared on a concert platform in 1927.

Farrell, bor. in Mercer co., Pennsylvania, U.S.A., on the Shenango R., close to Sharon city, with which it is industrially conjoined. Steel, castings, tin-plate manufs. Pop. 13,800. The name has been changed from Sharon since 1910.

Farrell, James Thomas (b. 1901), Amer. journalist and novelist and critic, b. at Chicago and educated at Chicago and New York univs. Worked in a gasoline filling station and as a salesman. Received the John Simon Guggenheim Foundation Fellowship in Creative Literature. His experiences as a baseball enthusiast and as a student in Catholic schools on the S. side of Chicago are the background of his novel *Young Lonigan* (1932). This was followed by *Gas House Mcintyre* (1933) and the trilogy *Studs Lonigan* (1935) for which he was awarded \$2500 from the Book of the Month Club. Other novels are *No Star is Lost* (1938); *Father and Son* (1940); *\$1000 a Week and other stories* (1942); *Bernard Clare* (1946).

Also three vols. of short stories: *Calico Shoes* (1934); *Guillotine Party* (1935); and *Can All This Grandeur Perish?* (1937). He has made a detailed and constant use of the naturalistic technique, especially in his chief book, *Studs Lonigan*. His characters live in the depressed areas of the S. side of Chicago and among street gangs and petty criminals. Most of them are casual in their morality and many are merely vicious. His writing shows the influence of James Joyce, Dreiser and Proust, but he reveals his keen interest in the ordinary facts of modern American life and his impatience with social and economic inequalities. Other works: *A Note on Literary Criticism* (1936); *My Days of Anger* (1943), and *Literature and Morality* (1947).

Farren, Elizabeth, Countess of Derby (c. 1759-1829), Eng. actress, and daughter of George F., an actor. She made her first appearance in London at the Haymarket in 1777, as Miss Hardcastle, in *She Stoops to Conquer*. This success was followed by Rosina in Colman's adaptation of *The Spanish Barber*, and many others. In 1782 she succeeded Mrs. Abingdon at Drury Lane. She played Hermione, Olivia, Portia, and Juliet, but her most successful rôles were Lady Betty Modiste, Lady Teazle, Lady Towly, and Lady Fanciful. In 1797 she married Edward, twelfth earl of Derby.

Farren, Ellen, commonly known as **Nellie Farren** (1848-1904), actress, came of an old theatrical stock, and made her first appearance on the stage at the age of five. She played many parts at Sadler's Wells, the Victoria, and the Olympic theatres, and earned the reputation of being both clever and versatile. It was only after she went to the Gaiety in 1868 and played prurient parts in burlesques that she became famous. She remained there, a great 'draw' in London, until 1891, when ill-health compelled her retirement from the stage.

Farrer, Sir Thomas Henry, first Baron (1819-99), Eng. statistician and civil servant, b. in London, and educated at Eton and Balliol College, Oxford. He was called to the Bar in 1844, but ceased to practise on entering the Civil Service as secretary to the Marine Dept. of the Board of Trade in 1850, a post which he held until 1886. He was an advanced Liberal in politics, and a strict free-trader. His theories on trade and finance are embodied in his writings: *The State in its Relation to Trade* (1883), *Free Trade versus Fair Trade* (1886); and his letters and essays in *The Times* and *Contemporary Review*. He pub. *Study in Currency* in 1898. He was created a baronet in 1883 and a baron in 1893.

Farriery, art of horse-shoeing. It is of anc. origin, and there is evidence that the art was practised by the Celts. It does not seem to have been in use among the Gks. or Romans. The art probably began to grow common after the overthrow of the W. empire towards the close of the fifth century. It has only recently been introduced into Japan, where the former practice was to attach slippers of straw to

the horse's feet, these slippers being renewed when necessary. In modern times the art has undergone many changes and improvements, as the methods formerly adopted were considered injurious to the animal and a considerable loss to the owner. The following are some of the chief causes of these evils: (1) Paring the sole and frog; (2) applying shoes which were too heavy and of the wrong shape; (3) using too many and large nails; (4) applying shoes too small and removing the wall of the foot to make the feet fit the shoes; (5) rasping the front of the hoof. These were often caused by unskilled workmen, who combined the duties of blacksmith and shoosmith in one trade, although they were not qualified. According to modern principles, shoes should be: (1) As light as compatible with the wear required of them; (2) the ground face of the shoe should be concave, and the face applied to the foot plain; (3) heavy draught horses alone should have toe and heel calks on their shoes to increase the foothold; (4) any excess of growth of the wall or outer portion of horny matter should only be removed in re-shoeing. Care is to be taken in keeping both sides of the hoof of equal height; (5) the shoes should fit accurately to the circumference of the hoof and project slightly beyond the heel; (6) as few nails as possible should be used; (7) the nails should take a short, thick hold of the wall so that the old nail holes may be removed in the natural growth and paring of the horny substance. The need for shoeing a horse's feet is generally well known. The foot is composed of a horny substance which becomes very brittle and breaks away, especially under the influence of moist weather, or of extra strenuous work. In order to prevent this, the rim of iron is placed on the foot and can be renewed from time to time. The shoes and nails are now manufactured with great economy by machinery. The advent of modern methods of locomotion and means of transit have greatly impeded the art of F. In the eighteenth and nineteenth centuries every vil. had its shoosmith, who, as mentioned above, combined his art with that of the blacksmith, thus causing evils which were only stamped out by modern systems of F. See J. Jeffray, *Address on the Present State of Farriery*, 1786; W. Douglas, *Horse-shoeing*, 1873; W. Hunting and A. Mattinson, *The Art of Horse-shoeing*, 1922; C. Holmes, *The Principle and Practice of Horse-shoeing*, 1928.

Farrukhabad, or **Farukhabad**, dist. and city of India, in the Agra div. of the United Provs. The dist. has an area of 1718 sq. m., traversed by a metre gauge branch line of the Bombay, Baroda and Central India railway. The chief products are indigo, sugar-cane, and potatoes. The cap. is Fategarh. The city of F. is situated near the Ganges, 86 m. N.W. of Cawnpore, and has a gov. gun-carriage factory. Pop. (dist.) 860,000; (tn.) 60,400.

Fars, or **Faristan**, one of the five great provs. of Persia (Iran), extending along the N. shore of the Persian Gulf. The

name is the same as the Gk. 'Persis,' which, originally the name of the prov. now called Iran, has come to be the name by which the whole empire is called. The prov. is traversed by mt. chains running parallel with the coast, intersected by fertile valleys, rich in pasturage, vines, and fruits, and studded with lakes, the chief of which is Lake Bakhtegan. The rivs. are small and seldom flow into the sea. The climate varies greatly according to the altitude. The prin. products are dates, rice, olives, cereals, cotton, and wine. The cap. is Shiraz (pop. 129,000). The area of Fars is about 53,000 sq. m. and the estimated pop. 750,000.

Farshut, or **Farshiout**, tn. of Upper Egypt, situated near the R. Nile, 20 m. S.E. of Girgeh in a picturesque country of astonishing fertility. Pop. 17,000.

Farsley, manufacturing tn. of W. Riding, Yorkshire, England, situated 3½ m. from Bradford. It has scribbling, spinning and cloth manuf. mills. Samuel Marsden, who first introduced Australian wool into England, and passed his life as a missionary in Australia and New Zealand, was born here. Pop. 6000.

Farther India, see **INDO-CHINA**.

Farthing (A.-S. *feorþa*, a fourth, and *ing*, a diminutive) is the smallest Eng. bronze coin, and is equal in value to the fourth of a penny. It was instituted as a silver coin in the reign of Edward I., in which form it continued until the time of Mary. James I. granted a patent to Lord Harrington of Exton in 1613 for the manuf. of copper Fs., but it was not until 1672 that they came into circulation in any number. In the reign of Charles II. tin Fs. were also in circulation for a short time. In 1860 copper Fs. gave place to bronze, in which form they have continued. The experiment of issuing half Fs. was tried in 1842, but not proving successful, the coins were demonetised in 1869. In 1853 the last year in which they were minted, 913,920 half farthings were coined. The present value of these coins is up to 1s. 6d. each according to date and condition. Half- and quarter-farthings were minted between 1839 and 1856 for use in Ceylon, and in 1844 one-third farthings were also struck for Malta. In 1897 the practice was adopted of darkening them before issue, that they might not be mistaken for half-sovereigns.

Farthingale (O.F. *verdugalle*, corruption of Sp. *verdugado*, from *verdugo*, a stick), case or hoop upon which were hung voluminous skirts. The material of the F. was originally wood and later whalebone. It was of Sp. origin, and reached its most exaggerated form in the seventeenth century, when it consisted of a flat circular surface, projecting from the bodice. It was the forerunner of the crinoline (q.v.) of the eighteenth and nineteenth centuries.

Farukhabad, see **FARRUKHABAD**.

Farwell, Sir George (1845-1915), Eng. lord justice: second son of Frederick Cooper F., of Tettenthal, Staffs; graduated from Balliol College, Oxford, and was called to the Bar in 1871. Decided the crucial point in the Taft Vale railway case, 1900, concerning the liability of trade

union funds to attachment for damages. In 1906, after being for seven years judge of the High Court, he was made lord justice.

Fasces were bundles of rods carried in ant. times by the lictors before the chief

magistrates of Rome symbolising their supreme power over the lives of the people. These rods were made generally of birch-wood or elm, and an axe protruded from the centre. Besides being borne before the magistrates they were also carried before kings and emperors, and in republican times before consuls and praetors. The number of F. was not the same in all cases, but varied according to the dignity of the magistrate. Twelve was the number allotted to a consul, and six to a praetor. In 508 B.C. Valerius Publicola set forth a mandate that in the city the axe should not be carried, since the consuls no longer had the power of life and death in Rome. The axe was present in the case of a dictator, who was preceded by twenty-four lictors, bearing the same number of fasces.

Fascia, or **Facia**, architectural term denoting the bands into which the architrave of the Ionic and Corinthian orders is subdivided. In the Roman Corinthian order the fascia are often divided into small mouldings. The bands are known as the first or upper F., the second or middle F., and the third or lower.

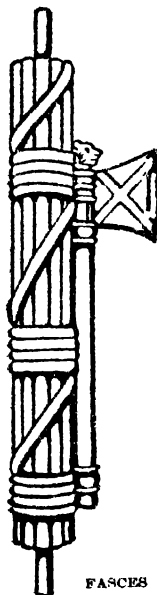
Fascines are brush-wood faggots used for military purposes. They are generally about 18 ft. in length, not quite a foot in thickness, and are bound tightly together by means of wire or withes. They are used for roofing magazines, for bridge and road making, and also for revetting the steps and slopes of field-works. When cut up into one-third of the length, they can be utilised in filling up a ditch, trench, etc., and are especially useful for supporting structures in marshy ground.

Fasciola, parasite which causes liver rot in sheep, see LIVER-FLUKE and TREMATODES.

Fascism. The name given to the political movement which arose in Italy soon after the First World War to deliver the country from Bolshevism, restore its economic equilibrium, and raise it to its rightful place in the family of nations. The movement was led by Benito Mussolini (q.v.), and successfully dominated administration in Italy from 1922 until

1943. The symbol of F. (*Fascismo*) is the same as that of the lictors of Imperial Rome—a bundle of rods (*fasces*) with an axe in the centre, and the *Fascista* salute is that of the ant. Rom.—by outstretched arm. The military organisation of the National Fascista Party—as it was officially constituted, with its Great National Council—was entirely on Roman lines, with Rom. names like 'legion', 'consul', 'centurion', 'triarii', 'senior' and so forth. The coins bore on one side the Rom. *fascio*, and special gold coins were issued to celebrate the anniversary of the famous 'March to Rome' of Oct. 21, 1922, which carried F. triumphantly into power. Discipline was most rigorous; and the motto of F., 'No discussion, only obedience,' serves to explain the rapidity of the sudden mobilisations and demobilisations carried out by the organisation. F. also possessed a large and powerful Press and a publishing house in Milan. But the decisive factor in the victory of F. was over and above all, the personality of its leader, the so-called *Duce*, Mussolini, the very soul of the movement.

F. did not, however, present an absolutely new political phenomenon, but was really part of the general historical development of nations, and it reveals the theoretical influence of Machiavelli and Nietzsche and also of Sorel and Pareto. It has been compared to the 'krypteia' of Sparta, and the 'eterie' of Athens, or other similar expressions of self-defence of strong active groups or classes, uniting and forming centres of resistance. Other illustrations may be found in the list of the Church in Italy, in the It. Communes, in England, in Germany, and in the Clubs of the Fr. Revolution. It came as a reaction to the complete apathy and disorder in parl. State functions in Italy and to the hypnotism of the It. working classes under the gospel of Lenin following the 1914-18 War, conditions which in 1920 were rendering the country an easy prey to the Communist peril. It was a time when the economic chaos was complete; foreign exchanges were disorganised; the police impotent; the Carabinieri insulted and even killed by the Communists. Resistance came from the patriots of the Trentino, the Carso and other battlefields of the War, and the first encounter between them and the Communists was in 1921 at Bologna, which date marks the wane of Bolshevism and the rise of F. Progress was at first slow; for the State was impotent and the only practical policy was force. But masses of the working classes were soon enrolled among the Fascist syndicates scattered all over Italy, and these began activities by settling many important economic disputes and strikes. The army was secretly or openly in favour of F., and, contrary to the hopes of the Communists, would never have marched against the Fascisti. The very generals of the regular army wore the black shirts of the organisation, and themselves directed the march to Rome. In the closing months of 1922 the members of F. increased by leaps and reached even to the Alps and S. Italy. Finally, in 1922,



FASCES

after a great meeting at Naples and after the March to Rome, Mussolini and his influential quadrumvirate, formed by Gen. de Bono, Cesare de Vecchio, Italo Balbo, and Michele Bianchi, the secretary-general of the party, was summoned by the King to form the first Fascista Cabinet. In his opening speech before the reconstituted Chamber, Mussolini declared the foreign policy of F. in these words: 'No imperialism, no aggressions, but an attitude which shall do away with the policy of humility which has made Italy more like the Cinderella and humble servant of other nations. Respect for international treaties at no matter what cost. Fidelity and friendship towards the nations that give Italy serious proofs of reciprocating it. Maintenance of E. equilibrium on which depends the tranquillity of the Balkan States and therefore European and world peace.' The invasion of Abyssinia some fifteen years later can no more be reconciled with this early statement of Fascist policy than his other imperialist aspirations. (See *infra*.) At Trieste, on Feb. 6, 1921, Mussolini made it clear that F. did not believe in the principles of the League of Nations, nor in those of the Red International, nor in the possibility of general disarmament; and he formulated the positive demands of F. as follows: revision of the treaties of peace where these might prove the cause of new wars; economic annexation of Fiume; emancipation of Italy by the development of her productive forces; renewal of relations with the ex-enemy countries, but subject to the maintenance of the existing It. N. and E. frontiers; vindication of the rights of Italy as regards its colonies; replacement of the old diplomatic representatives by others from the special univ. faculties; and the furtherance of the It. colonies in the Mediterranean and beyond the Atlantic by economic and educational means and by rapid communication.

The Fascist Party (as in other European totalitarian States) was the only authorised political organisation in Italy during the period of the prevalence of F. The social system aimed at was the Corporative State (*q.v.*). F. claimed to be neither capitalist nor socialist. It maintained private property but subjected its use to State control. Trade unions and manufacturers' associations, both Fascist-controlled, were bound to co-operate in the Corporation. Spirit and organisation in the Party were militaristic. The statute of the Party described it as a civil militia at the orders of the *Duce* or leader and dedicated to the service of the State, and that its chief aim was to achieve the greatness of the It. people. The Party was anti-liberal and anti-democratic, and stood for nationalism and imperialism. F. upheld violence, rejected civil liberties and claimed the monopoly of education in its youth organisations, the *Avanguardisti* for young children and the *Avanguardisti* for youths up to eighteen. The party maintained its own army with a training and standing almost equal to those of the regular army.

F. in its first decade certainly transformed the whole material, moral and political structure of Italy. Its achievements included, apart from the successful assertion of It. foreign policy in the Adriatic and Mediterranean, many great enterprises within the country itself. The more important of these were the reorganisation of the mercantile marine and the improvement of harbours; city planning; afforestation schemes which have clothed bare mts. with verdure; the reservation of special roads for motor traffic (also, later, in Libya) and the improvement of roads generally; and the creation of a network of airlines. One of the most beneficial schemes was that of land reclamation, begun in 1928, under which about 30 million acs. were reclaimed, an undertaking which, together with irrigation schemes, gave work to tens of thousands of men, besides increasing cereal production by some 20 million quintals, and thereby conducing to the emancipation of Italy from that dependence of foreign food which, as shown above, was one of the declared objects of F. from its inception.

It has been objected to F. that, like other institutions founded on dictatorships, it must be for ever providing spectacular benefits in order to retain popularity; and undoubtedly the Fascist State, in carrying out its ideals, did assume heavy financial burdens. Yet the material benefit to the country did up to a point outweigh the disadvantages inherent in all dictatorships, and for some time operated as a powerful influence on the imagination of the It. people as a whole. F. welded the country together, and, by a remarkable re-awakening of patriotism, tended to obliterate the old distinctions between the N. and S. and remove the traditional antipathies between city and city. It further strengthened national unity by effecting a conciliation between Church and State and by the settlement of the Rom. question. This latter, crystallised in the Lateran Treaties, was, perhaps, in these earlier years, Mussolini's most remarkable achievement; for the definite recognition by the Vatican of the House of Savoy as the legitimate rulers of Italy and of Rome as the cap. of the kingdom revitalised It. patriotism as perhaps nothing else could have done. But by 1940, when it became evident that Mussolini was waiting for a suitable opportunity to declare war on the allies, the sympathies of the Vatican were manifestly on the side of the latter. It is clear, however, that the estab. of F. entailed the abrogation of many fundamental rights of man, hitherto regarded as sacrosanct. This is exemplified in the Law of Dec. 24, 1925, defining the attributes and prerogative of the Prime Minister. Under this law Ministers were responsible to the King for the administration of their departments, but only to the Premier for their policy; and the Premier, with the Royal consent, could abolish or create new Ministries, and he alone could determine Cabinet policy as a whole or discuss policy with the King. (See also CORPORATIVE STATE.)

Jews co-operated with the Fascist Party from the beginning and held important posts; when Mussolini adopted an anti-semitic policy under Nazi influence in 1938, they were driven out. Other leaders besides Mussolini included, as well as the quadrumvirate noticed above, Count Ciano (*q.v.*), A. Starace, D. Alfieri, E. Rossoni, Italo Balbo (*q.v.*), and A. Farinacci (*q.v.*). F. served as a model to a number of similar political movements in other countries, notably, of course, to National Socialism (*q.v.*) in Germany and Falangism in Spain and, indeed, in a broader sense, the term 'Fascist' came to be used to describe almost any reactionary or authoritarian ruler, irrespective of profound diversities; as, e.g., Marshal Pétain (*q.v.*), whose policy as leader of the Vichy Gov. was increasing collaboration with Hitler; Salazar, the Prime Minister of Portugal, whose policy was formed on mildly Fascist lines; and Peron, the present dictator of the Argentine Republic, whose sympathies appear to be anti-bourgeois.

F., in the last decade of its influence, is associated principally with the Imperialist aspirations of Mussolini, during which period his public acts and statements presented a series of contradictions, crowned, as he became involved in the inevitable consequences of his overweening ambition, by an exemplary succession of betrayals. His political rake's progress was hastened by the Stresa Conference (1935), for this conference paved the way to the creation of the Axis (*q.v.*). Mussolini, after Stresa, imagined that he had the implied consent of Britain to his openly revealed designs on Abyssinia. The Axis was launched during the Sp. Civil war when he and Hitler in a flibustering adventure helped to establish a Fascist regime under Franco, but it did not take final shape until Italy's adherence to the anti-Comintern Pact (*q.v.*) in Nov. 1937. At this time Mussolini still retained some sense of the value of friendly relations with the Western Powers and he actually concluded a treaty of *bon voisinage* with Britain and opened similar negotiations with France. But he was already too far committed on the other path for these treaties to be implemented and soon Fascist Italy's bond with Nazi Germany was cemented by a military alliance. In 1939 without warning or pretext he invaded Albania with whose king Italy had a treaty of friendship of ten years' standing. When war broke out between Germany and the W. Powers fascist Italy announced that she would take 'no initiative' in the war. Historians may speculate on what basis of agreement with Hitler Mussolini took this step. The determining point of Mussolini's duplicity herein is that he delayed Italy's entry into the war until he felt convinced that Hitler's triumph was assured. Encouraged by the apparent success of this baseness he then attacked Greece—also a friendly country—without warning in the manner of the customary Nazi technique. But here his treachery availed him nothing and his armies had to be succoured by his

German ally. From that time, perforce, he allowed himself and his country to be drawn more and more ignominiously in the train of Hitler. On July 21, 1943, following the invasion of Italy, the Fascist Grand Council met and carried a hostile vote against Mussolini, who had returned from a conference with Hitler without the expected assurances of Ger. military assistance against the Allies. Marshal Badoglio (*q.v.*) was charged by King Victor Emmanuel to assume power. He dissolved the Fascist Party, and removed or purposed to remove Fascists from office. When Gen. Alexander's advanced guards entered Rome (June 4, 1943) the King, after investing his son with the office of Lieutenant of the Realm, went into retirement in order to leave the way open for the gov. of a co-belligerent Italy to be reconstituted on broader foundations, with the least possible relation to the old Fascist regime. The final *saure qui peut* of the Fascist hierarchy was precipitated by the victorious advance of Field-Marshal Alexander's armies into the N. of Italy and the surrender of the Ger. armies of Kesselring on April 29 (1945). The previous day the fallen and fugitive ex-Duce was apprehended and lynched by It. partisans in Milan. F. seems to have been more or less eliminated by 1946 when, after the elections of June 2, the new Christian Democratic Party emerged with over 200 seats, being only slightly outnumbered by the Socialists and Communists combined. See further under MUSSOLINI.

Bibliography. — *Mussolini's Political Speeches*, trans. by Barone di San Severino, 1923; G. Salvemini, *The Fascist Dictatorship in Italy* (New York), 1927, and *Under the Axe of Fascism*, 1936; G. Gentile, *Origini e dottrina del fascismo*, 1930; G. Bourgin, *L'Etat Corporatif en Italie*, 1935; H. Finer, *Mussolini's Italy*, 1935; L. Loiacono, *Le Corporazioni Fasciste*, 1935; Marcel Prolot, *L'Empire Fasciste*, 1936; E. B. Ashton, *The Fascist: His State and His Mind*, 1937; G. Bartolotto, *Storia del Fascismo*, 1938; A. Rossi, *The Rise of Italian Fascism*, 1938; M. H. H. Macartney and P. Cremona, *Italy's Foreign and Colonial Policy, 1914-1937*, 1938; R. Farinacci, *Storia della Rivoluzione fascista*, 1939; W. Ebenstein, *Fascist Italy*, 1939; W. G. Welk, *Fascist Economic Policy*, 1939; M. Brellat Milhaud, *Les Libertés Publiques dans l'Italie Fasciste*, 1939; D. A. Binchy, *Church and State in Fascist Italy*, 1941; Count Sforza, *Les Italiens tels qu'ils sont*, 1941.

Fashion (adapted from *Fr. façon*; Lat. *factio*, making, *facere*, to do, or make), used in the sense of the pattern or mode in which a thing is done, particularly employed in the sense of the customary or usual way in which a thing is done, and hence applied to the manner or custom prevalent or characteristic of a particular period, more especially as regards dress or costume. The terms fashion and fashionable are also applied to occupations, pursuits, education, etc., as well as to the necessities of dress, though it is in the latter sense it is chiefly used. The inven-

tion of weaving may be said to be responsible for the greater variety in the matter of garments; prior to this skins were, of course, the earliest form of clothing. Variations of costume were unknown to most matrons of the auct. world, and in the E. they are as unchanging in this respect as in everything else, the word F. not having the same significance there as it has in the W. The Romans spread their dress, together with their civilisation, over Europe, and in the fifth century it was gradually modified by the close-fitting garments of the races of the N. It may be said that in the W. the hist. of conquest is the hist. of F. Thus the auct. Briton made his garments of skins, which in Roman times developed into the skin coat or tunic, and later, doublet, and this in time became the prototype of the modern coat and waistcoat. F. in its modern sense may be said to have begun in the fourteenth century; for it is then that complaints seem to have first arisen of clothes being cast aside for others of newer style. Prior to the nineteenth century men's clothes were as sumptuous and delicate in texture as women's and Pepys, in his *Diary*, records how he had his wife's gowns cut up into waistcoats for himself. A marked feature in men's dress in the fourteenth century was the change from close-fitting tunic and hose to long, loose garments. Dress was originally a symbol of rank, strictly prescribed for the various classes of society, as clearly shown by the sumptuary laws prevailing from the thirteenth to the seventeenth century; but in the modern days this state of things has fallen into disuse except in the case of uniforms in the airforce, army, and navy, law, church, etc. Nowadays everyone can clothe himself as he pleases irrespective of station and rank. Political and religious opinions have been at times symbolised by dress, as in the case of the Puritans and Quakers, but nowadays the clergy are practically the only class of the community who mark themselves off from other men.

Dress attained its highest point of significance in France during the latter half of the eighteenth century, when it marked the various stages of the Revolution. Fashionable attire grew more and more eccentric and various with the increase of political turmoil: the women of France began to clothe themselves in the styles of Greece and Rome, the gorgeous and stately dresses of the courts of Louis XIV. and Louis XV. having disappeared with the old régime.

In the eighteenth and nineteenth centuries, fashions of the well-to-do women swung from the 'romantic' clothes which were in keeping with the extravagant and 'romantic' houses built in England at the end of the eighteenth century, to the simple and almost Quakerish dresses worn during the reign of Queen Victoria. Waists have been small, and waistlines have moved up and down. As dresses became less formal the waist line rose, heels were flatter, and less stiff silk was used, muslin, calico, and chintz taking its place; fine embroidery

was used as a decoration. Feet and ankles appeared and disappeared under sweeping or ankle length-skirts. Women's hair was cut short at the beginning of the nineteenth century, dressed in small ringlets, and fringes were worn, but by about 1830 it was long again and dressed high with fantastic bows and curls. Bonnets and hats followed the prevailing dress style, e.g., with the classical lines worn around 1760, bonnets were designed on the Grecian helmet, and later developing into the poke bonnet which lasted beyond 1860. Hats during the first half of the nineteenth century were very large and much overtrimmed; but after marriage small bonnets were worn, and this fashion remained until the 1880s. Later, the low-crowned, straight-brimmed straw hats ('boaters') arrived. Parasols had been carried since about 1775, and women carried bags which they called 'indispensables'. The crinoline was introduced from Paris, in 1854, and lasted about ten years. By 1865 women's skirts were becoming straighter in front and bunched in the back. But when women were educated together in colleges, and were beginning to play games after 1870, suitable costumes were needed. Women's rights and suffrage were discussed; women entered the professions; fashion responded to these moods, and in the early eighties her figure was concealed under bunches and folds of material. Extravagant fashions followed the Franco-Prussian war, sleeves were puffed, the full bustle returned and every extravagance in dress was encouraged. Then came the gay nineties, when dresses were over-decorated, but not beautiful. However, towards the end of the century, with the advent of the safety bicycle and lawn tennis, women's clothes became less hampering, so giving them more freedom and happiness. *Vests* were worn by women in 1884, at the time when mechanically-propelled vehicles were permitted to travel at 12 m.p.h. along untarred roads, to keep the dust from their hair. In the nineties the Amer. C. D. Gibson, originated the 'Gibson Girl' who figured in Amer. illustrations and advertisements. He thereby influenced the fashion of his day, and did much towards fostering freedom in women's clothes. This period was superseded at the end of the First World War by that of the 'flapper' with bobbed hair and knee-length skirts.

Some changes took place in men's clothes during the eighteenth and nineteenth centuries. For instance, knee breeches descended to mid-calf; shoes were tied instead of buckled; pantaloon of stockinette were worn to the ankle, with black silk socks and pumps for evening. Broad-brimmed Napoleonic hats replaced three-cornered ones, and gradually the crowns rose and, by the end of the eighteenth century the first tall silk hat had arrived. Men's hair was cut short; side whiskers were worn; collars stood up each side of the chin; dark cravats covering shirt fronts and collars. Coats were cut away to reveal silk waistcoats. Men's sleeves were worn



full at the top and gathered or pleated into the armholes; wide topped trousers narrowing at the bottom and strapped under the instep were made in white or coloured nankin; mackintoshes came in (Charles Macintosh having invented waterproofing in 1825). By 1855 mous-taches, which had previously been the privilege of the military, appeared. Later, men's trousers and sleeves became tight and the skirted frock-coat was generally worn. During the industrial period, however, men's clothes became greyer and greyer and more uniform.

At the beginning of the twentieth century, women's skirts became tighter, sleeves plainer, and in 1911 the long tight (hobble) skirt came in. Women adorned their dresses with hand-made lace, and large hats were worn. Clothes were made of woven fibres of wool, hair, cotton, flax, or silk. Later, artificial silk or rayon was produced from wood pulp, costing much less than pure silk.

The First World War had a far-reaching effect on women's mode of dress. Utility and serviceability attained a wider recognition than ever before, and women even defied attempts to impose upon them fashions which they felt would interfere with their freedom of movement and action. Women wore uniform, and tailor-made costumes came into wear. Elaboration ceased and simple 'slip-on' dresses were worn on all occasions. Waistlines

dropped to almost hip level. The abbreviated skirt, at one time carried to an undignified extreme, was favourably regarded by women for day wear, in place of the long, hampering, and unhygienic skirts of former days; sleeveless, low-necked, frocks were seen on r.v. and tennis court, cloche hats were worn and neutral shades prevailed.

Between the World Wars, Paris and Vienna may be said to have set the fashion in women's dress, while London was rapidly gaining in popularity, and Savile Row tailoring was still regarded as the mark of a well-dressed man. By 1926, skirts were beginning to be worn longer, and full length evening dresses returned. Women were less corseted than for many decades.

Men's wear during Edwardian times was formal, and the frock-coat and top hat were seen on Sundays and special occasions. The bowler hat, which had been the informal country hat of the 1850s, became the height of fashion for town wear. Later, the soft felt ('Trilby' or 'Homburg') was fashionable, and remains so. The 'lounge' suit has become the formal wear for town, and flannel or corduroy trousers with tweed jacket, knitted woollen pull-over, Amer-lumber-jacket, or battle-dress blouse, are worn in the country or on informal occasions.

Children's clothing followed the fashion

COSTUME AND FASHION FROM B.C. 20 TO A.D. 1949

1. Celtic Chief . . . B.C. 20	27. Knight . . . A.D. 1320	62. Puritan Man . . . A.D. 1650
2. Early Briton . . . A.D. 100	28. Lady . . . A.D. 1320	63. Puritan . . . A.D. 1650
3. Romanised Briton . . . A.D. 400	29. Nobleman . . . A.D. 1350	64. Woman . . . A.D. 1670
4. Saxon Chieftain . . . A.D. 900	30. Woman . . . A.D. 1350	65. Gentleman . . . A.D. 1675
5. Saxon Child . . . A.D. 900	31. Man . . . A.D. 1360	66. Lady of Fashion . . . A.D. 1675
6. Saxon Peasant . . . A.D. 900	32. Citizen . . . A.D. 1360	67. Gentleman . . . A.D. 1720
7. Anglo-Saxon . . . A.D. 1000	33. Boy . . . A.D. 1370	68. Lady . . . A.D. 1730
8. Anglo-Norman . . . A.D. 1080	34. Man . . . A.D. 1370	69. Man . . . A.D. 1745
9. Norman Knight . . . A.D. 1080	35. Man . . . A.D. 1430	70. Lady . . . A.D. 1760
10. Anglo-Norman . . . A.D. 1100	36. Boy . . . A.D. 1460	71. Gentleman . . . A.D. 1765
11. Norman Lady . . . A.D. 1100	37. Man . . . A.D. 1460	72. Boy . . . A.D. 1770
12. Anglo-Norman . . . A.D. 1120	38. Lady . . . A.D. 1470	73. Lady . . . A.D. 1775
13. Norman Noble . . . A.D. 1120	39. Man . . . A.D. 1470	74. Gentleman . . . A.D. 1785
14. Norman Bow- . . . A.D. 1130	40. Lady . . . A.D. 1490	75. Lady in Riding . . . A.D. 1790
15. Norman Woman . . . A.D. 1150	41. Gentleman . . . A.D. 1500	76. Man . . . A.D. 1800
16. Merchant . . . A.D. 1180	42. Gentleman . . . A.D. 1520	77. Man . . . A.D. 1830
17. Man of the . . . A.D. 1200	43. Lady . . . A.D. 1540	78. Woman . . . A.D. 1835
18. Little Girl . . . A.D. 1230	44. Apprentice . . . A.D. 1560	79. Man . . . A.D. 1836
19. Man of the . . . A.D. 1230	45. Gentleman . . . A.D. 1570	80. Woman . . . A.D. 1860
20. Woman of the . . . A.D. 1250	46. Lady . . . A.D. 1575	81. Man . . . A.D. 1860
21. Knight . . . A.D. 1250	47. Man of the . . . A.D. 1580	82. Man . . . A.D. 1862
22. Peasant . . . A.D. 1270	48. Boy . . . A.D. 1590	83. Woman . . . A.D. 1885
23. Scholar . . . A.D. 1270	49. Country Woman . . . A.D. 1590	84. Woman . . . A.D. 1895
24. Merchant . . . A.D. 1280	50. Gentleman . . . A.D. 1630	85. Man . . . A.D. 1896
25. Woman of the . . . A.D. 1280	51. Child . . . A.D. 1630	86. Man . . . A.D. 1897
26. Lady . . . A.D. 1280	52. Man . . . A.D. 1630	87. Woman . . . A.D. 1910
	53. Boy . . . A.D. 1633	88. Woman . . . A.D. 1930
	54. Cavalier . . . A.D. 1635	89. Man . . . A.D. 1937
	55. Gentleman . . . A.D. 1642	90. Woman . . . A.D. 1945
	56. Lady . . . A.D. 1640	91. Woman . . . A.D. 1945
	57. Man . . . A.D. 1645	92. Woman . . . A.D. 1949

of their elders, up to the early eighteenth century. They were hampered in movement, the boys being dressed in long coats, periwigs, tight knee breeches, high heels, and tricorn hats. But in the 1770s, children's clothes were being considered specially for them, and not as diminished replicas of their elders' fashions. Little boys wore long loose trousers, and shirts with low necks; but little girls still wore long frocks. At the end of the eighteenth century, frocks, made of soft cotton materials in white or pastel shades, were simple and charming (as seen by Kate Greenaway illustrations). At the beginning of the nineteenth century, bonnets were worn, collars frilled and goffered, 'Empire' frocks made in soft light materials appeared. Later, girls wore large hats, leg-of-mutton sleeves, and pantaloons. 'Back interest' appeared in little girls' frocks during the 1870s, frills, large bows, and fullness; and 'sailor' suits came in for boys. Eton collars and bow ties appeared a few years later. Thick dark materials were used for children's clothes by 1890, and smocking decorated the more expensive frocks. A new style of trousers, called 'shorts,' were worn by boys at the end of the nineteenth century, and also the black velvet 'Lord Fauntleroy' suit. White and cream replaced the dark materials of the preceding period, but some little girls still wore long frocks. However, in the early twentieth century children's clothes were shortened, boys trousers and girls frocks being worn just below the knee; and embroidery decorated cotton frocks. In 1914 the waistline dropped to around the thighs and remained there for two years. At this time a greater variety of materials was being used for children's clothes—the harder wearing tweeds, flannels, and serge for boys; and brightly coloured and patterned ginghams, voiles, and soft silks for girls. Knitting had become a habit and knitted jumpers and dresses became fashionable. Little girls' hair was cut short and large bows appeared. Clothes for children have now become much less cumbersome—dungarees, lumber suits, and play-suits for summer wear are sensible and popular garments.

For some years before, and during, the Second World War, sleeves were full and shoulders square. Skirts were worn shorter during the war: women went into uniform; and austerity reigned in Britain. The tailor-made costume with short blouse, or the tailored shirt frock, was generally worn. Paris fashions, although continuing throughout most of the war years, had little or no influence in Britain until almost three years after the war in Europe had ceased, when the 'New Look' came in with a flourish. It was accepted with eagerness; fresh interest was awakened in women's clothes; but its exaggerated lines gradually became modified. The nipped-in waist with full, short, basque, rounded shoulders, full skirts, calf or ankle length, was the fashionable suit for the spring of 1948. Summer fashions varied from the extreme

in design to the simple, well-cut frocks; and the 'New Look' suit, made in rayons and linens, was popular. Straw hats returned; the bonnets and pancake hats from Paris decorated with artificial flowers and tulle; together with the 'boater,' predominated.

In the autumn of 1948 the 'New Look' was very much modified and easier to wear. Sloping shoulders, tight waists, simple bodices with emphasis on skirts, calf-length for day wear, and longer for formal occasions. Skirts had two lines: the fullness which appeared at the hips in the ballerina skirts has now given way to pencil-slim lines, sometimes with fullness disguised in pleats or panels; or they flare from a slim hipline. The 'Gibson girl look' became popular again—tailored silk and soft chiffon blouses returned. Costume jackets still have nipped-in waists, rounded shoulders, and moderately curved hiplines, worn with either very slim skirts, or skirts moderately flared from the hips. Coats are full-backed loose or tent-like for informal or sports wear, collars and cuffs being large and hoods are sometimes seen. Formal coats are fitting to the waist with flared hemlines, and back interest. Weathercoats have at last been designed to brave wind and rain and yet look attractive. Proofed gabardine and corduroy are used for this purpose, and also a new material from Franco, called 'Contre Plaque.'

Dresses were sharply divided between the simple cut of the calf-length day dress, to the extravagant and striking fashions of formal afternoon and evening wear. 'Romantic' evening dresses with 'back interest' were designed, and the 'Empire' style reappeared. Many were décolleté and usually accompanied by fitted boleros or jackets. Also in the expensive models, tight hobble skirts and spectacular bustles were seen; but these exaggerated styles were ignored in the popular designs for the majority. In 1949, accessories were all important. For evening wear long Fr. suede gloves and scarves, and stoles are being worn to cover the shoulders in décolleté dresses. Fur was used as a trimming to emphasise large collars, cuffs, and pockets. Day jackets of velveteen trimmed with astrakan were worn over pleated skirts. Muffs were carried again, and fur booties worn. Umbrellas appeared in gay taffetas with rosette tops. In the hats for the winter no one style predominated but all fitted well on to the head and there was no ornamentation at the back to embarrass high-collared topcoats. Soft felt was used, almost all trimmed with veiling. Feathers were an important feature, and the bonnet came back. High-heeled shoes returned, and the court shoe was being generally worn. Some of the fabrics used included the woollens for all-day wear in pastel shades, seasonal shades being predominant. Checked and speckled tweeds of Scottish influence, and blanket and pilot cloths were used for sports and travel wear. Pile-surfaced woollens, such as velours and broadcloth,

are used for the more formal coats. Reversible overcoatings which need no lining, were popular for top coats. Formal afternoon and evening dresses were made of fine wools, rayons, taffetas, satins, and stiff silks. Velvet returned for evening wear. Corduroy material lends itself to so many uses in women's clothes, such as the informal slacks, sports jackets, formal coats and dresses, etc. Jewel colours predominate in this material, such as ruby, emerald, sapphire, etc. Nylon, which is a synthetically produced silk, is now widely used for stockings, underclothing, blouses, etc.

The development of athletics among women has greatly influenced their clothes. In the early days of lawn tennis women wore frocks or blouses and skirts in the prevailing fashion, but when skirts became long in the early 1930s a tennis costume at last appeared: stockings were gradually discarded; shorts were worn; and a sports suit was estab. quite independently of the fashion of the day. Bathing suits have to-day become extremely brief, consisting of brassiere tops and slips, but there is now a tendency towards the classical one-piece swim suit with V neck. Beach wear varies from the 'ballerina' beach-dress to the loose-fitting sailor's tunic worn over a swim suit or calf-length slacks. Full length slacks, in various materials—corduroy being popular for its hard-wearing qualities—are an easy garment for the present-day woman. Some riding clothes still retain their early nineteenth-century look. Men's shooting or country dress was specially designed about 1770, but in the early years of this century 'plus-fours' were designed for golfers, but later these became daily wear for some. Men have long discarded the top hat once worn for cricket; and tight knee-breeches and shirts have been replaced by cotton shorts and vests for football. Many developments of sports clothes have been Brit. products, the harder wearing woollen materials coming from Scotland; and with finer tweeds and smarter cuts it is expected there will be a new step forward in sports wear and that Britain is likely to excel in this product both at home and abroad. The kit of the present-day skiing enthusiast, skater, or woman aviator, would excite the envy of the old-time 'emancipated' cycling woman whose attempt to introduce the 'bloomer' costume was frustrated by public opinion. Women's stockings and underclothes, too, have changed from calico and cotton to pure or artificial silk; they are well cut and quite unlike the straight short-line chemises of former days. Silk petticoats are in fashion again, with the long skirts and frocks.

Fashion has changed much in this century, and it is difficult to say exactly what influences it. Wars, and post-war extravagances; economics, availability of fabrics; sport and education; all tend to have their influence, but it is the designer, himself, who dictates and most women follow his lines. See J. R. Planché, *The Cyclopaedia of Costume*, 1879; F. W.

Fairholt, *Costume in England*, 1896; M. G. Houston and F. S. Hornblower, *Ancient Egyptian, Assyrian, and Persian Costumes*, 1920; F. M. Kelly and R. Schwabe, *Historic Costume in Western Europe*, 1925; P. Macquoid, *Four Hundred Years of Children's Costumes*, 1925; M. Tilke, *Costumes of Eastern Europe*, 1926; H. Norris, *Costume and Fashion* (in course of pub.); M. von Boehn, *Modes and Manners of the 19th Century*, 1927-30; Iris Brooke and J. Laver, *English Costume of the 18th Century*, 1929, and *English Costume of the 19th Century*, 1931; J. Laver, *Letter to a Girl on the Future of Clothes*, 1946; Iris Brooke, *English Children's Costume since 1775*, 1930, 1935; *English Costume in the Age of Elizabeth*, 1933; *English Costume of the 17th Century*, 1934; and *English Costume of the later Middle Ages*, 1935; C. Willett Cunningham, *English Women's Clothing in the Nineteenth Century*, 1937, 1948; and *The Art of English Costume*, 1948; Margaretta Byers, *Designing*, 1939; Quentin Bell, *On Human Finery*, 1948; W. H. Hulme, *Women's and Children's Garment Design*, 1948; Alison Settle, *English Fashion*, 1948; T. B. Veblen, *Theory of the Leisure Class*, 1948. See also BOOTS AND SHOES; CRINOLINE; COSTUME DESIGN, THEATRICAL; EMBROIDERY; HAIR—Hairdressing; HATS; JEWELLERY; PLASTICS; TAILORING.

Fashoda (renamed Kodak in 1904), port on the W. bank of the Upper Nile, Egyptian Sudan, 459 m. S., by riv., of Khartum. It is the cap. of the *madiria* (prov.) of the Upper Nile. The station is built on a flat peninsula, separated, when the Nile is high, from a low-lying is. in the riv., with which it runs parallel, by a narrow strip of swampy ground. The climate is most unhealthy. F. is the residence of the 'Mok', or king of the Shilluk tribe. The Egyptian military post was estab. at F. in 1865, which was also an important trading station. In 1883-84 the post fell into the hands of the Mahdists. In 1898 the Fr. commandant, Marchand, with a force from the Congo, hoisted the Fr. flag there. Sir Herbert Kitchener, having just captured Khartum, re-hoisted the Brit. and Egyptian flags at F., and invited Marchand to withdraw. The latter refused, and the matter was referred to London and Paris. The Fr. protested that the Egyptian occupation of the Sudan had been suspended by the Mahdist domination and that it was open to them to make a settlement on the Nile. For a while the tension between the two countries was extreme, but in Dec. of the same year France, uncertain of the support of Russia, ordered the withdrawal of the Marchand expedition.

Fast and Loose, also called Pricking at the Belt, a cheating game much practised by sharpers at the fairs, especially by gypsies in the time of Shakespeare. A leathern strap is rolled or doubled up with a loop in the centre, and placed edgewise on the table. The sharper then seeks for some one to bet that he can catch the loop with a skewer, which looks easy; he then unrolls the belt in such a way that

the catching of the loop is an impossibility. From this game comes the expression 'to play fast and loose'; the modern name of the game is 'Prick the Garter.'

Fasti (Lat. *fastus*, lawful), the days on which it was lawful to do business. In early Rom. days such days were declared by the priests and later set up in the Forum on tables called *F.*, which were practically the equivalent of calendar. They were of two kinds, the '*F. sacri*,' or '*kalendares*,' strictly the calendars of the year, containing the list of lawful and unlawful days, the days for festivals and courts, etc., and the '*F. annales*,' or '*historici*,' which contained the names of the consuls and other magistrates, and such historical events as were considered worthy to be noted. See Ovid, *Fasti*.

Fasting, is strictly abstinence from all food and drink for a given period, but it is much more commonly used for abstinence from certain kinds of food only.

(1) *Religious*.—It is an accompanying feature of nearly every known form of religion; its motives and modes of practice varying, of course, according to race, climate, and civilisation. The origin of the practice is buried in obscurity; some authorities suggest that it arose from the custom of providing food for the dead, others that it was a preparation for the receiving of sacramental food, and others that it is the subjection of the lower nature in order to exalt the higher for the seeing of visions. Whatever the motive, partial or complete abstinence from food at stated periods was practised at a very early date by Parsees, Hindus, Egyptians, Assyrians, Gks., and Roms. It was a prominent and inseparable feature of the Jewish ritual. The solemn national fast on the tenth day of every seventh month (the Day of Atonement), the penalty for the non-observance of which was death, was the only public fast ordained in the Books of Moses (Lev. xvi. 29-34; xxiii.), but the practice of private and occasional public fasts, at periods of national calamity, is frequently recorded (Judges xx. 26; 1 Sam. vii. 6; 2 Sam. xii. 16). During the captivity the fasts of the fourth, fifth, seventh, and tenth months were instituted to commemorate certain incidents in the downfall of the nation. The number of special fasts mentioned in the N.T. and practised by the Pharisees and the disciples of St. John the Baptist (Luke xviii. 12; Mark ii. 18), although insisted upon by the Pharisees, were really voluntary, and were probably never practised by the sect of the Sadducees and others. There is no reason to doubt that our Lord observed the one great national fast, but He neither upheld nor practised the fasts ordained by the Pharisees. The apostles and the fathers of the early Christian Church, however, influenced probably by such passages as Matt. ix. 15, not only practised it themselves, but instituted *F.* as an obligatory practice for all the members of the Church. In the Rom. Catholic Church there are the great forty days' fast of Lent, the quatermonth fasts of three days in one week of each of the four seasons, while every Friday there

is abstinence from all flesh foods, and on the eves of certain feasts. In the Gk. Church the practice is followed with much greater severity, and the fast days cover about three-quarters of the year. In the Anglican Church *F.* is regarded only as a useful exercise, praiseworthy, but never obligatory, and not in itself a means of grace; the Prayer Book, however, enumerates the forty days of Lent, all the Fridays in the year with some exceptions, Ember days, Rogation days, and the eves or vigils of certain festivals. In Scotland the sacramental fast days so long observed have almost entirely fallen into disuse. The Moslems, as an offshoot of the Jewish and Christian communities, adopted the practice of *F.* with many others; they regard it as an efficacious means of averting the wrath of Allah in national calamities, and of mitigating the penalties of sin. The month of Ramadan, in which Mohammed brought the Koran from Heaven, is strictly observed as a complete fast for all the faithful, eating, drinking, and smoking being forbidden from sunrise to sunset, and voluntary fasts are common. See H. Nelson's *Festivals and Fasts of the Church* (24th ed. 1782); E. I. Lane, *Modern Egyptians*, 1836; Liesmayr, *Die Entwicklung der Christlichen Fastendisziplin*, 1877; E. Westermarck, *The Principles of Fasting*, 1907; R. Arbesmann, *Das Fasten bei den Griechen und Römern*, 1929. See also JEWS and MOHAMMEDANISM.

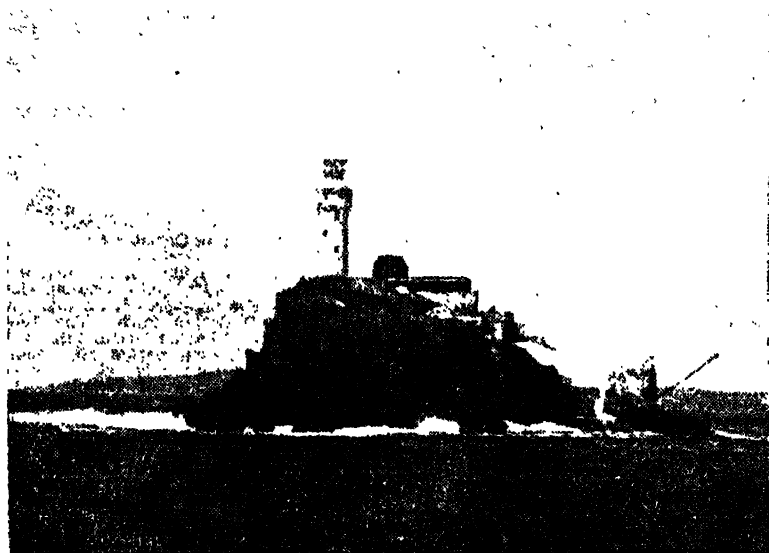
(2) *Medical*.—It is more especially to the abstinence from solid food that the term *F.* is applied. By experiments it has been proved that water is a great prolonger of life, so that whereas the human body cannot survive total abstinence for more than eight days, by taking water freely it is possible to sustain life for thirty or forty days. A Welsh girl, in 1859, who pretended that she had lived for two years without food, was put under the observation of doctors and deprived of food and water, but she died within eight days; whereas, in 1888, a Frenchman named Jacques, fasted from solid food for thirty days, but took water freely, and the same experiment was successfully tried for forty days by an It. named Lucel, in 1890. Some embombed miners survived for ten days in 1876, being kept alive by the aqueous vapour in the mine. Observations have proved that the body wastes less rapidly when kept warm and at rest; the external application of salt water has sometimes kept shipwrecked sailors alive, but they seem especially liable to delirium. The process of starvation is observed in the waste of the various tissues of the body, first the fatty tissues, and then the proteids of the muscles; emaciation is, of course, invariable, and a lowered temp., while apoplexy and intestinal ulceration are frequently accompanying features. A craving for food is insistent in the first days of a total fast, but diminishes, and torpor succeeds it. See J. Oldfield, *Fasting for Health and Life*, 1924.

(3) *Political or Contumacious*.—*F.* has, in modern times, been frequently resorted

to as a means of securing political ends. Thus, in the earlier days of the Feminist movement, 'suffragettes' fasted in the hope of furthering the attainment of their political goal. Hunger-strikes have frequently led to political embarrassment in Ireland, where persons convicted of unlawful activities against the State, have sought by this means to foment national sympathy for their 'martyrdom.' Forcible feeding is generally attended in these cases, but in others the attempt has been

with honour in France until 1440, but never completely cleared himself of the popular charges against him. He was reputed to have favoured Lollardy, which may account for Shakespeare's use of his name in Henry IV. when he dropped that of Oldcastle (*q.v.*). See *Chronicles of Monstrelet* and *Paston Letters*. See FAST-STAFF, SIR JOHN.

Fat, in chemistry, mixture of glycerides. When the suet of beef or mutton is heated in a muslin bag in water, and



FASTNET ROCK AND LIGHTHOUSE

L. Roumanus

unsuccessful and the 'hunger strikers' have either yielded or died.

Fastnet Rock, rock in lat. 51° 23' N. and long. 9° 36' W., situated about 4 m. S.W. of Cape Clear, off co. Cork, Ireland. A lighthouse erected in 1854 stands on the rock, and the light, which is revolving and 160 ft. above high-water mark, is visible for 18 m.

Fastolf, or **Fastolfe**, Sir John (c. 1378-1459), Eng. soldier probably b. at Calster, near Yarmouth. He served as a soldier in Ireland (1405-6), in Gascony (1413), and the campaigns of Henry V., and distinguished himself at Azincourt (1415) and 'the battle of the herrings' (1429). In 1423 he was appointed governor of Maine and Anjou, and created Knight of the Garter in 1423. The cause of the Eng. defeat at Patay (1429) was long a matter of dispute, and F. was deprived of the Garter by Bedford on a charge of cowardice, but was reinstated. He served

kneaded so that the membranes of the F. globules are broken, the melted F. may be collected in the form of a liquid which rapidly cools to tallow. If this tallow be heated to about 200° C. under pressure, it decomposes into glycerol or glycerin, a sweet syrup used in toilet preparations, and certain acids known as fatty acids. All the Fs., butter, lard, bone-fats, etc., and the liquid known as olive-oil, linseed-oil, palm-oil, etc., behave in this way. Glycerol is a trihydric alcohol, and, like the alcohols generally, reacts with acids to form ethereal salts, or esters. The esters of glycerol are termed glycerides, and are distinguished, according to the acids with which they are associated, as triacetin, tripalmitin, tristearin, triolein, etc. The chief glycerides present in Fs. are the solids tri-*almitin* and tristearin, and the liquid tri-*olein*. The relative proportions of solid and liquid glycerides determine whether the substance is a F.

or an oil at ordinary temps. Tallow, for instance, contains a preponderating proportion of tripalmitin and tristearin; lard, which is much softer, contains more triolein, while olive-oil contains a preponderance of triolein. At moderately high temps. the glycerides are decomposed by water into glycerol and their corresponding acid; thus, tristearin yields glycerol and stearic acid, triolein yields glycerol and oleic acid, and so on. The chief uses of Fs. are in the manufacture of soaps, as ingredients in articles of food, as lubricants, and as media for colouring matter, etc. Fs. constitute an important item in an ordinary diet. They contain a relatively higher proportion of carbon than protein, which is the chief constituent of lean meat; and as carbon is discharged in large amounts from the body, it is desirable to replace it by a corresponding preponderance of Fs. and carbohydrates in the diet. In Arctic regions, where the heat of the body has to be kept up by a plentiful supply of combustible material, human beings crave for F. to an extent incomprehensible to dwellers in temperate climates. See E. R. Bolton, *Oils, Fats, and Fatty Foods*, 1928; H. K. Dean, *The Utilisation of Fats*, 1938; T. P. Hilditch, *The Chemical Constitution of Natural Fats*, 1940. For F. in the digestive process, see DIGESTION. See also ADIPOSE TISSUE.

Fatalism, philosophic doctrine of the futility of human struggles against destiny, and is the basis of such different systems as those of Hegel and Herbert Spencer. The Stoics associated it with the idea of necessity, and contended that as such it was a power unalterable even by God. Theologically, it is the belief that life is governed by inevitable laws which depend on the arbitrary decrees of an Almighty, and also by the laws of nature; it is exemplified in Spinozism and in the later ideas of predestination. F. is essentially an Oriental conception, and is the predominating spirit of E. philosophy, literature, and religion, finding its strongest expression in the Mohammedan idea of Kismet.

Fata Morgana, It. name for a curious kind of mirage frequently observed in the Straits of Messina, and so called because it is supposed to be caused by the fairy (*fata*) Morgana of the Arthurian legends. An observer on the shore frequently sees men, ships, or houses, sometimes in the air, sometimes in the water, the same object frequently having two images, one inverted. The cause is the same as that of the desert mirage. See MIRAGE.

Fatehgarh, see FUTEHGHUR.

Fatehgarh, or Futehgarh, tn. of India, and the administrative headquarters of the dist. of Farrukhabad, situated on the Ganges in the Agra div. of the United Provinces. It was a Brit. military station since 1802. Scene of a European massacre (Indian mutiny, 1857). An Amer. Presbyterian mission settlement is here. Pop. 20,000.

Fatehpur (Futehpur). (1) Cap. of a dist. of the same name in the Allahabad div. of the United Provinces, India, 73 m. N.W. of Allahabad. It has two fine mosques,

and a trade in grain, butter, and leather, especially ornamental whips. The dist. lies in the S.E. corner of the Doab (*q.v.*), between the Ganges and the Jumna, with an area of 1618 sq. m., most of which is highly cultivated. Pop. of dist., 650,000; of tn., 15,000. (2) A fort. tn. of Rajputana, 145 m. N.W. of Jaipur. Pop. 16,000.

Fatehpur Sikri, former cap. of the Mogul empire, 23 m. W. of Agra, founded in 1569 by Akbar as a thank-offering for the birth of his son, Selim. The magnificent architectural ruins, enclosed by a high wall 7 m. in circumference, include a splendid mosque and sev. palaces, including that of Akbar. It was deserted within fifty years of its foundation owing to lack of water. Pop. about 6000.

Fates, *The*, see MOIRAE.

Father, see FAMILY; PARENT; and CHILD.

Fatherhood, *The Divine*, the metaphor of Fatherhood is used in most branches of the Christian Church to show the distinctive feature in the Christian idea of the relation of God to man. In ethnic religions the idea is foreshadowed, but before the coming of Christ it hardly went beyond the idea of God as the progenitor of all things. The idea of the personal and individual relationship between God and each of His creatures is an inherent part of the Christian faith. The Jews called Jehovah 'Father' (Isa. lxiii. 16), and called their own nation His 'Son' (Isa. xi. 1), but they only acknowledged Him as the 'Father of Israel'; the Gentiles were excluded. Christ included all men (Luke vi. 35) as 'children of God', although undoubtedly the phrase 'your Father' which occurs so frequently in the 'Sermon on the Mount' refers more particularly to His own immediate followers (Matt. v. vi. vii.). In this sense it is used by St. John (I. iii. 1-2), and still more clearly so by St. Paul in his use of the figures of 'adoption' (Roms. viii. 14-15), where he clearly shows his belief that it is only those who 'knowingly' are led by the Spirit of God who are His 'Sons.' As Christ Himself draws the distinction between 'My Father' and 'your Father' (N.B.—He never speaks of 'Our Father') so does St. Paul amplify it (Roms. viii. 15-17). Some few sects of the Christian Church, notably the Calvinists, have denied the 'Fatherhood' of God, regarding Him only as the 'Judge', which would account for the unbending sternness of their teaching. See H. S. Candlish, *The Fatherhood of God*, 1866; C. H. Wright, *The Fatherhood of God*, 1887; H. H. Wendt, *Teaching of Jesus* (trans. Wilson), 1892; A. B. Bruce, *Kingdom of God*, 1889; A. M. Fairbairn, *Christian Modern Theology*, 1907; N. Söderblom, *Das Werden des Gottesglaubens*, 1916.

Father of the Chapel, name bestowed on a person in any printers' trade society who is held responsible for seeing to the faithful performance of the duties and regulations by the members of that society. A chapel exists for each section of the trade, i.e. composing-room, stereotyping, etc., within each printing house.

Fathers, Apostolic, see APOSTOLIC FATHERS.

Fathers of the Church. The patriarchs are described in the O.T. as the 'Fathers of Israel,' and the early Christians, who looked upon themselves as spiritual Israelites, kept up the use of this title. But for long the Christians abstained from giving the name 'father' to their own spiritual heads, for they remembered our Lord's warning, 'Call no man your father upon the earth' (Matt. xxiii. 8). However, we read that the mob of Jews and pagans at the martyrdom of Polycarp cried out, 'This is the Christians' father.' In the fourth century we find that Athanasius defends the term *πατριάρχης* as having been earlier used by certain 'fathers,' and after this the word frequently occurs in councils, such as those of Constantinople and Chalcedon. In the stricter sense of the term, the Fathers of the Church are those writers of the early centuries who were remarkable for their perfect orthodoxy, and great sanctity, and their writings have ever been regarded as, after the Bible, the most valuable portions of Christian literature. The term is, however, also used to include Tertullian and Origen, and other writers either slightly or entirely heterodox. In the great *Patrologia* of the A. B. Migne, writers such as Theodoret of Mopsuestia and Pelagius are included, but these come under the last head of the sub-title, which runs: *Sive Bibliotheca omnium Patrum, Doctorum, Scripturumque ecclesiasticorum.* Those tainted with heresy or of very slight importance are, indeed, generally spoken of not as 'fathers' but as ecclesiastical writers (*scriptores ecclesiastici*), though they are sometimes included under the former title. Thus the study of patristics or patrology is not restricted to orthodox writers. Almost invariably the fathers of the first century are considered apart from the rest under the title 'Apostolic Fathers,' and so we have here a good starting-point. This distinctive title was bestowed upon the immediate friends and disciples of the Apostles, while the *patristic* period proper may be said to commence with the second century, but no definite date can be assigned as marking its termination. Migne, in his *cursor completus*, carries his patrology down to about 1200 for the Latins and to the Fall of Constantinople for the Gks., but for ordinary purposes this range is too extensive. A more common boundary is the time of Gregory the Great (d. 604) in the W. and that of John of Damascus (756) in the E. After this time the freshness and spontaneity of thought which mark the early writers almost entirely disappears. Two groups of the fathers stand out pre-eminent above the rest, and receive the title 'Doctors of the Church.' The W. or Lat. Doctors are Ambrose, Augustine, Jerome, and Gregory the Great; the E. or Gk. Doctors are Athanasius, Basil the Great, Gregory of Nazianzus, and John Chrysostom. The chief div. between the Apostolic Fathers and the limits named above comes with the Council of Nicea and the Conversion of

the Empire. Chief among the Ante-Nicene fathers may be named: Justin Martyr, Clement of Alexandria, Origen and Dionysius, Gregory Thaumaturgus, Methodius, Tertullian, and Cyprian. Chief among the Post-Nicene fathers we may mention Eusebius of Caesarea, Athanasius, Cyril of Jerusalem, Basil, Gregory of Nazianzus, Gregory of Nyssa, John Chrysostom, Theodoret, Cyril of Alexandria, Photius, Hilary of Poitiers, Ambrose, Augustine, Jerome, Rufinus, Leo the Great, John Cassian, Hilary of Arles, Vincentius, and the English Bede. See J. G. Dowling, *Notitia Scriptorum ss. Patrum*, 1839; H. G. Krüger, *History of Early Christian Literature in the First Three Centuries*, trans. 1897; F. J. Hort, *Six Lectures on the Ante-Nicene Fathers*, 1895, and various eds. of the fathers.

Fathom, measure of 6 ft. chiefly serviceable for taking marine soundings such as regulating cable lines; also used for mines. This metre is the standard for most European nations. The word fathom comes from the A.-S. *fæthm*, the measurement of the width to which the two outstretched arms extended.

Fathometer. Instrument for measuring the depth of the ocean, by measuring the interval of time that elapses between the production of a sound at the surface of the sea and the arrival of the echo from the bottom. Great strides have been made in recent years in the development of these instruments, first suggested in 1912 after the disaster to the *Titanic*. To-day every important ship is equipped with a F., and the reader is referred to *Wood's Sound Waves and their Uses* (1930) for an excellent account of the various types now used.

Fatigue: (1) In physiology, 'Muscular F.' is the diminishing of the contractions brought about by stimuli. The muscle is a machine for utilising the energy contained in its own chemical compounds: if the excitations of the muscles are continued beyond a certain point the muscle cells are poisoned by the excreta of their own waste chemical products. The muscle recovers if allowed to rest unstimulated for a time, or more quickly if washed with an innocuous but un-nutritious solution such as 6 per cent NaCl in water. The same waste-products of the muscles produce 'F.' in the unsheathed ends of the nerve-plates, and the central sensor and motor nerve cells exhibit the same phenomena and a general irresponsiveness to ordinary stimuli.

(2) In materials, F. is the term used to denote the weakening of a metal bar by a repeated succession of the strain of loads considerably less than the breaking weight of the bar, as when a car-axle breaks from the continued strains and blows which it experiences, or a member of machinery, such as a piston-rod, which is constantly in alternate tension or compression. F. of metals is due to a molecular change in the metal due to vibration or the constant application of a varying strain.

Fatigue-duty is that part of a soldier's work which is distinct from the use of arms and military drill, such as loading stores.

'Fatigue call' is the bugle note which calls to such duty, and 'fatigue dress' the uniform worn while engaged in it.

Fatima (600-632), daughter of Mohammed and Khediya. She was considered by her father to be one of the four perfect women of Islam, and was espoused to Ali, Mohammed's nephew and adopted son, when only fifteen years of age.

Fatima, vil. in Portugal that was the scene of miracles in 1917, now a place of pilgrimage.

Fatimides, name given to a dynasty of Arabia, which reigned for nearly two centuries over Egypt. Its founder, Obaidallah, claimed to be descended from Fatima, daughter of the prophet Mohammed, and Ismael, great-grandson of Ali. But later it was suggested that the founder of the dynasty had no right to the sovereignty, and that he was in reality descended from a family of heretics known as the Carmathian sect. When Obaidallah came into power, he assumed the title of Al-Mahdi, Commander of the Faithful, and reigned supreme over the whole Muslim world. But he became unpopular through his assassination of Al Shii and his brother; his reign was one long series of hostilities against surrounding powers. He d. in 933, and was succeeded by Al Qu'aim, who was much pestered by the conspiracies of Abu-Yazid and his sons. He was defeated by them at Kalrawan in 943, and in 944 was imprisoned in his own cap. He d. in 945 during the Siege of Susa, and was succeeded by his son Al Mansur Isma'il. Abu-Yazid was finally quelled by this sovereign. The centre of the F. power became ultimately transferred to Egypt in the reign of Mo'izz liden Allah, who expelled the reigning family and, assuming the title of caliph, founded the city of Cairo (970). But after his death the power of the F. gradually waned, and they were content to allow the gov. to fall into the hands of the viziers. The sovereignty of the F. was at last only recognised in certain external ceremonies and observances, such as the mention of them in public prayer, the impression coins, and the paying of tribute to the vizier of Cairo. The last F. caliph to reside in Egypt was Al-Adid. After his death, the founder of the dynasty of the Ayubides, Saladin, reigned over Egypt.

Fattening Foods, Fodder, and Forage Crops, term used to denote those foods which are mainly used for 'feeding up' cattle. Investigation has shown that in estimating the value of animal manure (feeding stuff for plants) 90 per cent of the nitrogen of food may be reckoned to be recovered in the case of feeding cakes, pulse, and other highly nitrogenous foods, 85 per cent in case of foods comparatively poor in hydrogen, e.g. cereals, roots, etc., and less than 65 per cent in the case of bulky feeding stuffs such as hay and straw. As a source of manure the value of fattening food is greater the more nitrogen they contain. Practically speaking, the whole of the mineral constituents and about nine-tenths of the nitrogen of food are recovered in the dung and urine. For

the same weight of dry substance consumed, oxen void more manure than sheep, and sheep more than pigs. The composition of the different foods given to fattening animals being well known, it is easy to calculate the amounts of nitrogen, phosphoric acid, and potash of the food which will be recovered in the manure. Each constituent having its mkt. value as a manuring constituent, the money value of the manure obtained from the consumption of a ton of any ordinary food of which the composition is known can be easily determined. Assuming ammonia to be worth 8d. per lb., potash 2d. per lb., and phosphate of lime 1d. per lb., the money value of the manure produced by the consumption of a ton of various foods can be deduced.

Fodder crops, or forage crops, are grown for consumption by live stock in the green or succulent state, and include numerous leguminous plants, a few cruciferous plants, any of the cereal crops in a green condition, and other grasses, including the ordinary hay crop if eaten fresh, or if stored as silage. Fodders have the important advantages of requiring a minimum of labour, and in some cases of growing so rapidly that they can be produced as catch crops in the intervals between the crops of ordinary rotation, while leguminous fodders actually improve and renovate the soil. Cabbages and thousand-headed kale are very nutritious fodders, and given a fair rainfall grow anywhere, resisting frost well and liking transplanting; they need a heavily manured soil, and can be consumed on the land by sheep or cut and eaten in the yards by cattle. Rape grows in any soil, and follows early potatoes or an early corn crop, or provides a succession of green food for sheep after two or three months. White mustard grows rapidly, providing a good sheep food in six weeks or less. Of leguminous fodders the varieties of clover are the most important. Crimson or It. clover, commonly called Trifolium, is grown as a catch crop after corn, the other needing usually a full year to provide sufficient growth. They are therefore sown with corn crops, commonly being broadcasted just before or after the first hoeing of the cereals. Lucerne is very valuable on dry calcareous loams and in dry seasons, owing to its deep rooting habit, yields an abundance of rich green food. In clean ground it can stand a number of years and be frequently cut. Sainfoin requires similar culture, and on limestone soils is of great importance in sheep farming. Vetches and tares are grown to provide a long succession of green food for sheep and also for cattle and horses. Lupins make a rich sheep food on poor sandy soils, and the young shoots of gorse are eaten readily and are utilised on otherwise barren land. Other important fodders are rye, grass, maize, and prickly pomefrey. See D. H. Robinson, *Leguminous Forage Plants*, 1937; J. S. Watson, *The Science and Practice of Conservation: Grass and Forage Crops*, 1939; M. Hall (ed.), *Five Hundred Varieties of Herbage and Fodder Plants*

(Commonwealth Agricultural Bureau), 1948.

Fatty Acids, group of organic compounds so called because the higher members are found combined with glycerol in fats (*q.v.*). They have the general formula $C_nH_{2n+1}CO\cdot OH$, and may be regarded as derivatives of the paraffins, the alcohols, or the aldehydes. The prin. members of the series are formic acid, acetic acid, propionic acid, butyric acid, valeric acid, heptylic acid, lauric acid, myristic acid, palmitic acid, and stearic acid. The first six, except acetic acid, are liquid at ordinary temps., possess a pungent smell, and are readily miscible with water and alcohol. The higher members are solids of a waxy or fatty nature, have little smell, are insoluble in water, but are dissolved by alcohol and ether. They are very stable compounds, and, with the exception of formic acid, they are oxidised only with difficulty.

Fatty Compounds, or **Aliphatic Compounds**, one of the great divs. into which the substances studied in organic chemistry are divided. The word "fatty" was originally applied to the acids derived from the paraffins, but is now extended to denote all compounds regarded as directly or indirectly derived from methane.

Fatty Degeneration, a derangement of metabolism by which the protein matter of the tissues, is replaced by fat. Under normal conditions, globules of fat pass from the digestive tract into the tissues, where they are either oxidised to keep up the heat of the body, or are stored in the cells of adipose tissue. Under certain morbid conditions, however, the oxidising capability of the cells seems to be interfered with. The cytoplasm is invaded by granules of fat which can be recognised by the usual fat-staining reagents. The manner in which the change is brought about is somewhat obscure, but it is always associated with some toxic agent. All dead and decaying matter in the body undergoes F. D.

Faucher, Léon (1803-54), celebrated Fr. statesman and writer on political economy. He both ed. and contributed to the political journals, the *Constitutionnel* and the *Courier Français*. In 1842 he visited England in order to study the industrial conditions and afterwards compiled his *Etudes sur l'Angleterre* (1845). At the close of the Revolution of 1848 appointed minister of public works for the dept. of Marne and later on minister of the interior. Served under Louis Napoleon, but resigned his office when the emperor advocated universal suffrage. He was a firm upholder of free trade.

Faulstich, Helena Saville (1817-98), Eng. actress, daughter of John Saville F. She took the Shakespearian parts of Juliet, Imogen, and Hermione, and made such an impression on Macready that he engaged her to take the leading characters in Lytton's *Duchesse de la Vallière*, *Lady of Lyons*, and in Browning's *Stratford*. She married Theodore Martin, in 1851; he was knighted in 1880.

Faults is the name given to any displacement of strata or veins in the earth's crust. They occur in the group of rocks known as sedimentary or stratified rocks. These consist of regular layers of rock of various kinds. Many railway cuttings show examples of rocks formed by sedimentary deposit, and the regular layers which the solid rocks thus exposed to view exhibit can easily be seen. Every running brook which carries down particles of sand, earth, or gravel and deposits them in the lower portions of the bed shows the agency which must have produced the various sedimentary formations. All such strata must have been formed in like manner during long periods of time, and what is now dry land must formerly have been under water. The highest parts of what is now the dry land of the globe were once covered by the

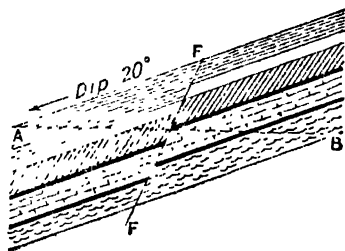


DIAGRAM OF FAULT (FF)

The angle made by the slope of the strata with the horizontal line AB is the angle of dip of the strata

ocean. It seldom happens that the sedimentary strata exhibit a horizontal arrangement through any great distance. More frequently they have been upheaved and displaced after they were first deposited. Sometimes the land has subsided so that the strata are displaced along a ridge, while another ridge remains quite firm. Thus, what is known as a *F.* results. The strata are inclined at various angles to the horizon, and sometimes the successive layers of deposit are bent and distorted, giving evidence of pressure exerted upon them. Earthquakes often cause *F.* in the strata. In many cases sedimentary strata are broken through by masses of igneous rocks, which, by their intrusion in a melted form, have often caused an upheaval of strata. *F.* are also caused by subsidence of the inner portions of the earth.

Faun, **Faunus**, rural deity in Rom. legend and regarded as the god and protector of shepherds. Later on the name became identified with the Gk. god Pan. *F.* was supposed to have been the third sovereign of the Laurentines; his predecessors Picus, the deity of storm and lightning and Saturnus, the god of seed-time and harvest.

Fauna, term used by naturalists in reference to the collective animal life of any dist. or of any period in hist. Thus we have the F. of the Brit. Isles, or the F. of the Antediluvian age. F. is derived from the F. of mythology, creatures who were regarded as the protectors of wild animals.

Faure, François Félix (1841-99), Fr. politician, b. in Paris, son of a furniture maker. He became a tanner and merchant at Havre, where he was very successful financially. Elected member of the National Assembly in 1881, he took a keen interest in economics and politics. Appointed under-secretary for the colonies in M. Férrier's ministry in 1888; vice-president of the Chamber in 1893; appointed President of the Republic in 1895 upon resignation of Casimir-Périer. It was through his diplomacy and tact that the Franco-Russian alliance was accomplished in 1897. See E. Maillard, *Le Président Faure*, 1897.

Fauré, Gabriel Urbain (1845-1924), Fr. musical composer, b. at Pamiers. He studied at the School of Sacred Music, directed by Medermeyer, under Dietsch and Saint-Saëns. He became choir-master at the church of the Madeleine in 1877, and organist in 1896. Director of the Conservatoire, 1905-20. His music includes pieces for the piano, pieces for the strings, orchestral music, cantatas, and opera—*Prométhée*; *Pénélope*. His *Birth of Venus* was performed at the Leeds Festival in 1898. See lives by A. Bruneau 1925; V. Jankélévitch, 1938; and N. Suckling (Master Musicians), 1946.

Fauresmith, tn. in the Orange Free State, cap. of the div. of the same name, about 65 m. from Kimberley. The Jagersfontein diamond mines lie a few miles to the S.E.

Fauriel, Claude Charles (1772-1844), Fr. historian and philologist, b. at St. Etienne. He was a student of Sanskrit and Arabic, as well as of Lat. and Gr., and was appointed a prof. in the Paris Faculté des Lettres. His lectures as prof. appear in *Histoire de la Poésie Provençale*, in which he attempts to prove that the old Sp. and Ger. poetry originated in France. His works include a trans. of E. Baggesen's *Parthenais* (1810), and A. Manzoni's tragedies (1823), and *Modern Greek Folk Songs* (1824), *Sur l'Origine de l'Epopée du Moyen Age* (1833), and his greatest work, *Histoire de la Gaule Méridionale sous la Domination des Conquérants Germains* (1836).

Faust. The legend of F. is held by many historians to be of Eastern origin, but its European interest devolves on a sixteenth century magician, F., or Faustus, of Suabia, reputed to have studied necromancy in Krakow and to have exploited Germany in the rôles of astrologer, diviner, medium, alchemist, and swindler, a veritable ally of Mephistopheles. The earliest hist. of F. appeared at Frankfurt in 1587, and was speedily followed by numerous and varied versions, each more embellished than the previous one, the chief of these being G. R. Widmann's (1599). From this, J. N. Pützer compiled

an encyclopedic version of which six eds. appeared between 1674 and 1726. The chief Ger. ed. of the period was pub. in 1712, under the authorship of 'Christlich Meynenden' (A Christian Believer). Meanwhile, due to the intolerant bigotry and narrow Protestant sympathies of the 1587 ed., which were strongly in keeping with contemporary religious prejudices, it appeared very rapidly in foreign trans., Dan. being the first (1588), Eng., Fr., Dutch, and Flemish following during the next six years, and Czech in 1612. The Eng. trans. was the basis of Marlowe's *Tragicall History of Doctor Faustus* (performed in 1594, pub. 1601), the finest of the early F. dramas. In Germany every little puppet-show had its own version of the legend, right up to the middle of the eighteenth century. In 1759 Lessing's dramatised version was written, but has since been destroyed save for a few sheets of MS.; it was in his hands that the legend first assumed the shape which has become definitive, a more modern and tolerant spirit superseding the stern uncompromising attitude of the earlier eds. Goethe was the first to introduce the Gretchen incident into his magnificent work (1798). This violation of the legend had no apparent reason, beyond broadening the secular dramatic interest to meet modern demands; and the innovation was condemned by purists as unjustifiable. However, it is Goethe's version—well called the 'divine comedy' of eighteenth century humanism—that has become recognised as the greatest literary achievement of the vast number that have been attempted on the same subject, and round it has arisen an important and extensive musical literature. Music was written for a production at Stuttgart (1832) by Lindpainter, and a score by Prince Radziwill was pub. in 1846. A choral dramatic legend by Borlitz, *La Damnation de Faust*, was performed at Paris in 1846, the text being derived by the composer and Gaudonnières from De Nerval's adaptation. The most famous setting is Gounod's *Faust*, performed at Paris in 1859—a very beautiful five-act opera to a libretto by Barbier and Carré. Boito's *Mefistofele* (Milan, 1868) is also from the same source as those of Gounod and Berlioz. On a lower plane altogether, and quite estranged from Goethe's masterpiece, is the *Faust* of Spohr, a romantic two-act opera to a wretched and vulgar text by Bernhard, produced at Frankfurt in 1818. Goethe's work has also inspired some 'absolute' music, notably the *Faust Symphony* of Liszt, and Wagner's *Faust Overture*. See H. G. Meek, *Faust, Man and Myth*, 1930; G. Blanquis, *Faust à travers quatre siècles*, 1934; P. Palmer and R. Moore, *The Sources of the Faust Tradition*, 1936.

Faust, Johann (a printer), see Fust.

Faustina, Annia Galeria, usually called **Faustina the Elder** (A.D. 104-141), wife of Antoninus Pius and mother of Faustina the Younger.

Faustina, Annia the Younger (c. A.D. 130-175), was the wife of Marcus Aurelius Antoninus and daughter of Faustina the

Elder (*supra*). Both were accused of gross profligacy, but there is some doubt of this, for they were both honoured after death by their husbands, who founded 'Puellæ Alimentariæ Faustinae' institutions for the relief of poor girls.

Fauvism, movement in art which originated in Paris in 1903 as a revolt against Impressionism. It became the name of a group of artists among whom were Matisse, Dufey, Derain, Lhote, Vlaminck, Marquet and Friesz. These sought to invest colour again with spiritual values. The name F. is derived from a slighting reference by the Parisian art critic, Louis Vauxcelles, to the gallery of works of the artists of the group. He called it a 'cage aux fauves,' or cage of wild-beasts.

Favara, tn. in the prov. of Girgenti, Sicily, about 4 m. E. of Girgenti. Its chief products are sulphur and marble. Pop. 21,600.

Favart, Charles Simon (1710-92), Fr. dramatist, b. in Paris. He was educated at the college of Louis-le-Grand, and his poem, *La France Délivrée par la Puellle d'Orléans*, obtained a prize at the Académie des Yeux Floraux. He became director of the Opéra Comique, which, under him, rose to a height of success. In 1746 he went with Maurice de Saxe to Flanders with a troupe of comedians, where he became very popular. In 1750 he returned to Paris and resumed his writing. Some of his works (all written 1754-63) are: *L'Anglais à Bordeaux*, *Les Trois Sullanes*, *Ninette à la Cour*, and *Mémoires et Correspondance Littéraire*, which gives valuable information of the literary and theatrical world of the eighteenth century.

Faversham, municipal bor. and riv.-port of Kent, about 10 m. from Canterbury. It dates back to about 811, and was a seat of the Saxon kings. It contains the remains of a Cluniac abbey, founded by King Stephen, in which he is buried, and has a grammar school which was started in 1527. It has a quarter sessions court and a separate commission of the peace. It is important for its oyster fisheries, which are under the direction of an ancient guild, as well as for its shipping trade in coal, timber, and agric. produce, including especially hops and cherries. There are also powder-mills in the vicinity; brewing, cement, and brick-making are carried on. Pop. 10,000.

Favonius is mentioned for the first time in 61 B.C., during the transactions against Publius Clodius for having violated the rites of the Bona Dea. On this occasion he joined Cato, whose sternness he imitated throughout his life, and went so far as to receive the nickname of the ape of Cato. He was a man of weak character and the motives of his actions were passion and personal animosity, and not the consideration of the public good. His only honourable action is the conduct he showed towards Pompey after his defeat.

Favonius, name given in Rom. mythology to a wind which blew from the W. or S.W., and usually prevailed in spring. It is the same as the Gr. *zephyrus*.

Favre, Jules Claude Gabriel (1809-80), Fr. statesman, b. at Lyons, and studied for the Bar at Paris. He took part in the Revolution of 1830, and openly declared himself a republican. He made himself conspicuous when Louis Napoleon was elected President of France, and tried to organise an armed resistance in the streets of Paris. He estab. his reputation by his defence of Orsini, 1858, and in 1870, after the defeat at Sedan, proposed the deposition of the Emperor Napoleon III. He was minister of foreign affairs under the Republic, and told Bismarck (1870) that he 'would not yield to Germany an inch of territory nor a single stone of fortresses.' He made sev. mistakes during the war, and on its conclusion withdrew from the ministry.

Favularia, species of fossil plants, found first in the Devonian period, but most prolific in the Carboniferous. It belongs to the genus *Sigillaria*. The stem branched dichotomously, the leaves were large, and the venation was parallel.

Favus, contagious skin disease, caused by a fungus parasite. It usually affects the scalp in man, but is occasionally found on other parts of the body. It also affects cats, dogs, cattle, mice, rabbits, and other animals. The growth consists of a number of yellow, circular saucer-shaped scabs, each surrounding a single hair. The scabs grow and become encrusted; ultimately they break off, leaving a bare patch without a trace of hair. The characteristic scab may then develop again, as it is extremely difficult to get rid of all traces of the parasite. The fungus was first described by J. L. Schönlein in 1839, and from the name of its discoverer is called *Acherion Schönleini*. It is more common in the E. parts of Europe than the W., and is often associated with uncleanly habits. Contagion may take place from animal to man. The treatment involves removing the crusts with every consideration for cleanliness. The parts should then be dressed with an efficient parasiticide.

Fawcett, Edward Douglas (b. 1866), Eng. philosopher, b. at Hove and educated at Newton College, Devon and Westminster school. In philosophy he is an idealist whose distinctive mark is the discussion of imagination as the fundamental reality of the universe (see *Contemporary British Philosophy*, vol. ii., 1925). Pubs.: *Divine Imagination*, 1921; *The World as Imagination*, 1918; *The Zermatt Dialogues*, 1931; *From Heslon to the High Alps* (1936); *The Oberland Dialogues* (on the soul), 1939. In his *Hartmann the Anarchist* (1893) he claims to have anticipated the romance of the war aeroplane.

Fawcett, Henry (1833-84), Eng. economist and politician, was b. at Salisbury. He was educated at King's College, London, Peterhouse, Cambridge, and Trinity Hall, where he became seventh wrangler in 1856, and was elected to a fellowship. He entered at Lincoln's Inn with the intention of becoming a member of Parliament through a career at the Bar, but was unfortunate to lose his eyesight in 1858. He, however, kept up all

his recreations, fishing, rowing, skating, as well as his studies. He was a disciple of Mill, and pub. in 1863 a *Manual of Political Economy*, the result of which was the election of Fawcett to the chair of political economy at Cambridge. In 1865 he was elected member for Brighton, and re-elected in 1868-74, and is spoken of as being a thorough Radical. In 1873 he took a prominent part in opposing Gladstone's scheme for univ. education in Ireland. He was a great advocate for the preservation of commons, especially those near large trns., and showed a marked interest in Indian affairs. In 1880 he was offered the place of postmaster-general by Mr. Gladstone, and estab. in 1882 the parcels post. He is also responsible for the introduction of postal orders, sixpenny telegrams, stamp slip deposits, and the increased facilities for life insurance and annuities. His pub. include *The Economic Position* (1865), *Pauperism* (1871), *Free Trade and Protection* (1878), *Indian Finance* (1880).

Fawcett, Millicent Garrett, Dame (1847-1930), b. at Aldeburgh, Suffolk. She was the daughter of Mr. Newton Garrett, and famous for her social and literary work, especially as an advocate of women's suffrage and the higher education and employment of women. In 1867 she married Henry F., the politician. She held the degree of LL.D. (Hon.), St. Andrews, and was president of the National Union of Women's Suffrage Societies. Pub.: *Political Economy for Beginners* (1870), *Tales in Political Economy* (1875), *Essays and Lectures* (jointly with Henry F.), (1872), *Some Eminent Women of our Time* (1889), *Life of Sir William Molesworth* (1901), *Five Famous French Women* (1906), *Women's Suffrage* (1912), *What I Remember* (1921).

Fawkes, Guy (1570-1606), Eng. conspirator, was b. at York. He was a zealous Rom. Catholic before he was of age, and served in the Sp. army in the Netherlands from 1593-1604. He came to England at the invitation of Catesby and was initiated into the gunpowder plot. He was entrusted with the actual accomplishment of the design owing to his exceptional courage and coolness. See GUNPOWDER PLOT.

Fawn, see under DEER.

Fay, Andráš (1786-1864), Hungarian poet and author, was b. at Kóhány in the co. of Zemplén. He was educated for the law, but settled at Pest, and devoted himself to literature. The pub. of his satirical fables (*Mesék*) in 1820 estab. his reputation, and he became one of the most popular authors of his time. He was also a writer of plays, romances, and novels. Of his novels the most famous are *The House of the Belleks*, and *Doctor Jávör*; both are humorous. He was founder of the first savings bank at Pest, and one of the founders of the Hungarian national theatre.

Fay, Morgue de, see MORGAIN LE FAY.

Fay, William George (1872-1947), Irish actor and theatrical producer, one of the founders of the modern Irish dramatic movement which grew into the Abbey

Theatre, and one of the creators of the style of quiet acting which made that theatre famous. After acting with a travelling circus company in Ireland and England, he took leading parts in Abbey plays until 1908, when he left, with his brother Frank, after a disagreement with the directors in policy. The Fays took a company to the U.S.A., but it had indifferent success. E. from 1910 acted in various London theatres and in repertory in the provs.; in Glasgow he was in charge of the Scottish National Players. In his late years he deserted the stage and took only occasional parts in films; his most successful part was that of Father Tom in the film *Odd Man Out* (1947).

Fayal, one of the Azores Is. It has a fine bay, on which floral, the chief tn. stands. Area about 37 sq. m. Pop. about 27,000. See AZORES.

Fayette, Comtesse de la, see LAFAYETTE, MARIE MADELEINE, COMTESSE DE.

Fayette, Gilbert Mottier, Marquis de la, see LAFAYETTE, MARIE JOSEPH, MARQUIS DE.

Fayetteville: (1) city in Arkansas, U.S.A., cap. of Washington co. It is the seat of the Univ. of Arkansas. There are deposits of coal in the vicinity, and the region round is noted for its fruit, especially apples. Pop. 8200. (2) city in N. Carolina, U.S.A., cap. of Cumberland co., situated on Cape Fear R., which has been rendered navigable as far as the coal mines of Chatham co. The former name of F. was Campbelltown, the change being made in memory of Lafayette. It was the scene of a terrible flood in 1908. Pop. 17,400.

Fayolle, Marie Emile (1852-1928), marshal of France, b. at Le Puy. Entered the Ecole Polytechnique in 1873, and afterwards joined the artillery. Instructor at Ecole de Guerre, 1897. Brigadier-general on retired list when the first World War broke out. On mobilisation, was given command of 70th Reserve div. Succeeded Pétain in command of 6th Army, Feb. 1916. Transferred to 1st Army in Dec. In May 1917 was in command of group of armies in centre, and in autumn was in Italy to assist at Caporetto. Soon recalled, did excellent work until armistice; was retained as general of div. on Gen. Staff, and made marshal Feb. 21, 1921.

Fayrer, Sir Joseph (1824-1907), surgeon-general and author. In 1850 he became assistant-surgeon in Bengal, and his connection with the Indian medical service lasted for forty-five years. He was a prolific writer on subjects connected with the practice of medicine in India, and above all on the venomous snakes of that country. His great work on *The Thanatophidia of India* is the best book on the subject.

Faz, see FIZ.

Fazogl, mountainous dist. of the Anglo-Egyptian Sudan, which is traversed by the Blue Nile. It produces gold, senna, gum, tamarinds, and ivory. Pop. about 500,000 (Funj negroes).

Fealty, was the service or duty served by a tenant to his superior lord in feudal

times. Lands were granted on the conditions of F., suit of court, and rent, it being stipulated that tenants and their heirs should take the oath of F. or fidelity to their lord, which was the feudal bond between lord and tenant: should attend the lord's courts and give assistance by serving on juries, etc.; and should pay certain ann. returns in military attendance, provisions, money, or whatever was required of them. The right of F. is still exacted from copyholders in England, and was in existence in the United States after the Revolution.

Fear. The emotion of F. arises in apprehending evil to come. Its characteristics are misery or depression, the prostration of the active energies, except in the form of running away from danger, and the excessive hold of the related ideas. The pain from some actual infliction, such as a blow, a deranged organ, a bitter taste, a discord, a loss, may be severe, but mere pain is not terror. Only when the mind apprehends some painful infliction still in the future, are we liable to the emotion. Although F. is one of the most elementary emotions, it is one of the most complicated. It presupposes the following mental laws and conditions: (1) For its explanation it is necessary to render a complete account of present pain, both physical and mental. On the mental side we must remember the stimulus of the will, on the physical side the manifestation of present pain, the spasmodic violence of the early stage and the prostration of the functions at all stages. (2) We need to understand the revival of pain in idea, and the subsistence of the state by purely mental forces. (3) Attention must be given to the state of expectation, or belief, as opposed to mere idea or fancy unconnected with any real occurrence. (4) The most characteristic feature in the situation of terror is uncertainty, ignorance, and darkness. In the case of a great but certain and understood evil, the ideal pain may be simply a measure of the reality of the case. The irregular, disproportionate, and eccentric courses connected with terror are brought into relief under future evil of unknown amount or character.

Characters of fear.—Physical. The usual and obvious signs of F. imply organic derangement and muscular relaxation, accompanied with strong efforts in particular directions. The result of the whole is a loss of power, and a vehement exertion to escape danger. **Mental.** The general description of the mental state of F. is massive pain or general depression of tone. The strongest figures for massive pain are applied to it, viz. melancholy, gloom, darkness, despair. The excited gaze is part of the voluntary strain. Intense watchfulness must accompany any efforts to avoid an evil agency. The shriek of terror would be in accordance with Darwin's view, of the original employment of the voice, viz. to call for help from companions. In fear we see the extreme case of the 'fixed idea,' or the influence of the feelings upon the conduct through the medium of the intellectual

trains. See A. Mosso, *La Peur*, 1908; W. B. Cannon, *Bodily Changes in Fear*, 1915; E. Williams and E. Hoag, *Our Fear Complexes*, 1924; G. F. Morton, *Childhood's Fears*, 1925; S. Freud, *Inhibitions, Symptoms, and Anxiety*, (trans.) 1936.

Fear, Cape, promontory on the Atlantic coast, forming the S. point of Smith's Is., in the S. of N. Carolina. This is, stands at the mouth of Cape Fear R. and has a lighthouse on its W. end. The riv. is 350 m. long, and is navigable as far as Fayetteville (120 m.). Its entrances were blockaded during the Civil war.

Fearne Isles, see FARNER.

Feast, or Festival, a day on which the ordinary labour of life is laid aside and enjoyment of a more or less religious nature is indulged in. Throughout the whole world, wherever the general religion of the country has been dear to the whole of the nation, the fixed state festivals have been associated with religion. Probably the Persians are alone among the world's nations in having no regular feasts, and this condition of theirs is artificial rather than natural. Egypt had many festivals, days consecrated to the Nile, Osiris, Ptah, and all her countless deities. The Hindu still observes his anct. festival in the anct. way, except that he must no longer offer human sacrifice. The earliest account of Gk. festivals—that in the *Iliad*—speaks of two alone, but in later times these increased greatly in number. The expenses of the festivals were met from the public purse. In the later days of the Rom. empire, the city revelled in innumerable feasts, those not only of her own anct. gods, but also those of the deities imported from the E. Different feasts became important at different times, but we may name the *Sementina* the festival of the seed-time in January; the *Lupercalia*, in honour of the god Pan; and the *Saturnalia*. Almost all of these festivals were celebrated by the pagan world with disgusting accompaniments. The Egyptian sensuality was surpassed by the E. debauchery introduced into Rome, and the excesses committed at the Hindu festival of Shiva are utterly unspeakable. The Heb., however, kept their feasts, described in the O.T., with the greatest strictness. (See PASS-OVER; PENTECOST; PURIM.) The Christian Church associated some of her festivals with the Jewish and some with the old pagan festivals, calling special attention to the religious significance. See M. Dresser, *De Festis diebus*, 1590; J. B. Tilliot, *Mémoires pour servir à l'histoire de la Fête des Fours*, 1741; T. Thistleton Dyer, *British Popular Customs*, 1911; W. Mead, *English Medieval Feasts*, 1931; F. Martin, *Observing Natural Holidays and Church Festivals*, 1910. See also CARNIVAL; CHILDRENS DAY; CHRISTMAS, CANDLEMAS DAY; CLAVIE, BURNING THE; CORPUS CHRISTI; EASTER; EPIPHANY; FOOLS, FEAST OF; GUY FAWKES NIGHT; HALLOWEEN; HOCKEY; HOLY WEEK; LADY DAY; LORD MAYOR'S DAY; MARTINMAS; MICHAELMAS; MAY DAY; PLOUGH MONDAY; SHROVE TUESDAY; ST. VALENTINE'S DAY.

Feather Grass, see *STIPA PENNATA*.

Feather River, in California, U.S.A., trib. of the Sacramento, which it joins about 18 m. above the city of Sacramento. It has a length of 250 m., and is navigable for steamers to Marysville. Gold is found on its banks.

Feathers, horny outgrowth of the skin which is peculiar to birds, and which corresponds to the scales of fishes and reptiles and the hair of mammals. Feathers as a rule consist of two main parts, axis and barbs, the former of which is divided into the quill, which is bare and hollow, and the shaft which bears the barbs. The quill is embedded in the skin, and has at its base a small hole through which the

of the contour F.; and powder-down F., which occur in patches, especially in birds of the heron tribe, and exude a fine dust or powder which gives a peculiar bloom to the plumage. As regards the colour of F., it is usually most prominent in the male birds. F. have been put to various uses. Of these perhaps the chief is their employment for stuffing beds, cushions, and quilts, and for this the F. of the elder-duck are most highly esteemed, those of the goose and swan coming next. F. are also used as quills for writing, and for personal adornment.

Feather-Star, or **Sea-Lily**, popular name of *Crinoides* (g.v.), a class of Echinodermata. The commonest species is *Antedon rosacea*.

Featherstone, urb. dist. in the Osgold-cross par. div. of the W. Riding of Yorkshire, England, about 24 m. from Pontefract. Large collieries are in the neighbourhood, and these afford employment for the inhab. Some miners were shot dead during a riot in 1893. Lord Bowen and his fellow-commissioners in the report on the F. riots dealt with the duty of soldiers called in to suppress riots and this report is the *locus classicus* on the point.

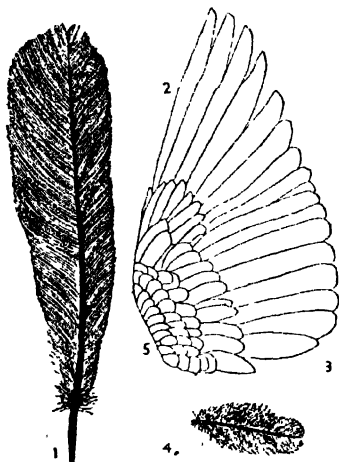
A soldier (says the report) for the purpose of establishing civil order is only a citizen armed in a particular manner. He cannot because he is a soldier be exonerated if without necessity he takes human life. The duty of magistrates and peace officers, to summon or abstain from summoning the assistance of the military depends in like manner on the necessities of the case. . . . To call for assistance against rioters from those who can interfere only under such grave conditions ought, of course, to be the last expedient of the civil authorities. But when the call for help is made and the necessity for assistance from the military has arisen, to refuse such assistance is in law a misdemeanour. . . . It is not usual to resort to extremities with rioters until after reading the proclamation under 1 Geo. I.; but this preliminary is by no means a condition precedent to the exercise of the common-law powers of suppressing riots.' (Parl. Paper, 1893-94, c. 7234). Pop. 15,000.

Febronianism, powerful movement which was propounded in 1763 in Germany by Johannes Nikolaus von Hontheim (1701-90) under the pseudonym of 'Justinus Febronius' with the object of restricting the papal power, and of giving independence to the national Churches.

February, second month of the year, containing twenty-eight days in ordinary years, but twenty-nine in leap years. It was introduced into the Rom. calendar by Numa as the last month of the year, and continued in this position until 452 B.C., when it was placed after Jan. The name comes from the Lat. *Februarius* from *februare*, to purify, and was originally the month in which the 'Februa,' or great Rom. festival of purification, was held.

Febronius, see HONTHEIM, JOHANN NICHOLAUS VON.

February Revolution, see under FRANCE—History.



1, Quill of Pigeon, 2, quill feathers, 3, left wing of Thrush, 4, contour feather of Pigeon, 5, contour feathers

nutritive sap passes during the growth of the F. The barbs which constitute the vane are lath-shaped and taper to a point, and each one supports a series of outgrowths known as barbules, so that each barb is like a tiny F. As a rule the barbs are linked to each other by means of the barbules, but in the running birds, e.g. the ostrich, they are free, hence the familiar loose plume. Many F., too, have an 'aftershaft' or second shaft springing from the under side near where the quill passes into the true stem. This is as a rule small, but in some birds, viz. the cassowary and emu, the aftershaft is as large as the mainshaft. There are several kinds of F.: Contour F., which form the general outline of the body and of which the 'flight F.' are most developed; down F., which are hidden by the contour F. and often form a very thick covering, as in gulls and ducks; fly-plumes, which are found in all birds in clusters at the bases

Fécamp, seaport tn. of France at the mouth of the R. Fécamp, in the dept. of Seine-Inférieure, about 22 m. N.E. of Le Havre. It has a tidal harbour and dock taking vessels of 20 ft. at neap tide, and of 26 ft. at spring tide. There are cotton, wool, and oil mills, as well as sugar refineries, tanneries, and a benedictine liqueur distillery. The chief imports are coal, timber, tar, and hemp, and the exports oil-cake, lint, cod, and benedictine liqueur, which is said to have been manufactured by the Benedictine monks of the abbey as far back as 1510. The tn. contains a sixteenth century church (St. Etienne) and the abbey church of La Trinité (c. 1190). Pop. 16,800.

Fechner, Gustav Theodor (1801-87), Ger. psychologist, b. at Gross-Särchen, near Muskau, in Lower Lusatia. Became prof. of physics in Leipzig, but subsequently devoted himself to psychology. His chief work on the subject was *Elemente der Psychophysik*, and though he follows Spinoza in asserting that bodily facts and conscious facts are two distinct sides of one reality, he is original in trying to discover a mathematical relation between them. He was in the main the originator of that species of psychology which investigates human faculties with the aid of exact scientific apparatus. He wrote also on the theory of colour and galvanism, as well as poems and essays. See lives by J. E. Kuntze, 1892; W. Pastor, 1904; and J. Hermann, 1926.

Fechter, Charles Albert (1824-79), Fr. actor, b. in London. He made his debut at the Comédie Française as Seide in Voltaire's *Mahomet*, after which he went to Berlin, where he achieved great fame by playing the part of Armand Duval in *La Dame aux Camélias*. In London his impersonation of Hamlet and Othello was an extraordinary triumph.

Fœciales, or **Fœtiales** (etymology uncertain), were Rom. priests, whose duty it was to determine the circumstances under which hostilities might be commenced, and to demand satisfaction from a hostile state. Four F. generally crossed the borders and launched a spear with appropriate ceremonies, to denote the proclamation of hostilities (*clarigatio*).

Fecundation, see **FERTILISATION**.

Federal Bureau of Investigation (F.B.I.), formed in 1908, a branch of the U.S. Dept. of Justice, for the investigation of crime and all offences against the law throughout the country. Its headquarters are in Washington, and it has offices in forty-two states.

Federal Council of Evangelical Free Churches. An organisation, whose members represent most of the churches of Protestant denomination in the U.S.A., which was formed in 1903 for the general purpose of acting in matters of common interest to the constituent churches. The Council carries out a number of particular objects through commissions. These particular objects include social service, research and education, the improvement of industrial relations, the promotion of international justice, the improvement of relations with the negro pop. or the

country, etc. The Council also acts as the liaison between the church and such national social agencies as the Red Cross, and the Child Welfare (q.v.) Movement. About 140,000 local churches are represented by the Council and the communicant membership is over 20 millions.

Federalist, The, was a collection of essays pub. in 1787-88 in New York at the instigation of Hamilton, to defend the new gov. They appeared in the semi-weekly *Independent Journal* of New York under the above title, and were written by Alexander Hamilton, James Madison, and John Jay. There were in all eighty-five essays, which were all collected and subsequently pub. in book form. The collection is still regarded as a classic textbook of political science. See *Everyman's Library* ed.

Federalist Party, The, was a political party which was in power in the United States, 1789-1801, and which practically died about 1820. Its chief leaders were Alexander Hamilton and John Adams, and Washington himself was also closely identified with the Federalists. The party reorganised the executive depts., created the federal judiciary and the territorial system, and introduced excise laws, a U.S.A. bank, a protective tariff and bounty system to develop manufs. and agric., and a postal system. They also began a new navy, but were prevented by the Democrats from going on with it. This was really the death-blow to the Federal party, since they were no longer able to protect their commerce by force, but had to do so by humiliating concessions to England.

Federal Reserve System, U.S.A., introduced by Congress in 1915 by way of reforming Amer. finances and freeing the banking world there from Wall Street's control. Under the system there are some twelve Federal Reserve banks vested with powers in their sev. areas, somewhat analogous to those possessed in England by the Bank of England. Every national bank is compelled to join the system. Each of the regional banks has large gov. deposits, each issues paper currency. The difference, however, between the Eng. and the Amer. method is that whereas the bank-rate in Great Britain responds easily and naturally to the laws of supply and demand, as the Bank is now responsible for the integrity of the paper currency, these Federal Banks of America have the larger liberty of regulating a currency in conditions of greater freedom and less responsibility. Undoubtedly these powers are used wisely, but the fact remains that the system gives opportunities for inflation which do not now exist in England. In 1936 the Federal Reserve Board came into office under the Banking Act of 1935. The Board has seven members, appointed by the President on the advice of the Senate. It has wide powers to control the supply of credit and to supervise banking.

Federal Trade Commission. An organisation set up by the Amer. Gov. in 1914 to check the growing menace of trusts and monopolies (see **Trusts—Commercial**).

'The struggle between the gov. and the trade combines ever since 1890, when the Sherman Act was passed, has been a record of legal victories for the gov. that have been practically mitigatory; and the action of 1914 was evidently an endeavour to control and influence powers that could not be broken. After the world war of 1914-18 the Wells-Pomeroy Act mitigated some of the older restrictions of anti-trust legislation by legalising the alliance of great firms with each other for the purpose of marketing their goods in foreign lands. The F.T.C., which was estab. to prevent unfair business practices in inter-state commerce, has investigated alleged violations of the anti-trust laws. See I. L. Scharfman, *The Inter-state Commerce Commission*, G. C. Henderson, *The Federal Trade Commission*, and T. C. Blaisdell, *The Federal Trade Commission*.

Federated Malay States, see MALAY STATES.

Federation and Federal States. A federation (Lat. *fœdus*, a league) is a union between two or more states, in which each retains its autonomy, while a central representative gov. controls matters of general concern. The Amphictyonic League of anct. Greece, the earliest on record, seems to have been religious rather than political. Among other Gk. leagues were: the Thessalian, very powerful about 370 B.C.; the Ætolian, a well-organised federation composed of a number of tribes living N. of the gulf of Corinth, having a general assembly which met yearly, and a permanent committee acting as an executive gov.; the Achean, which became a great political force about 251 B.C., originally comprising ten cities of Achaia, it ultimately included Athens, Megara, Ægina, and almost all the Peloponnesus; this, too, was a real federation. Coming now to modern hist., a remarkable and important league, the Hanseatic, was first formed by the cities of Hamburg and Lübeck about 1247 A.D. to protect their commerce against pirates and robber-barons. Gradually, over eighty tns. joined them, and the Hansa Federation (Old Teut. *hansa*, a defensive league), though never formally recognised by the empire, was for centuries a great power. It held its own courts of justice, enforced obedience among its members, and bargained and fought with kings and princes, on one occasion equipping a fleet of 248 ships, with 12,000 men. The Hanseatic Diet, held triennially at Lübeck, was not dissolved until 1630. Modern civilisation with its improved means of communication and transport, and with many highly organised communities capable of political combination on equitable terms, has facilities for more extensive federations than were possible in anct. times. Bavaria and Saxony could federate with Prussia, but no power of old could federate with Rome, and the holding together by mutual agreement of immense tns., like those of the U.S.A., would have been beyond human conception. Still, though conditions have altered, principles remain the same. A federation is not a mere

alliance from which either of the contracting parties can withdraw at will, nor is it a union in which one predominant power can assume control in local as well as general affairs. Safety and efficiency require a strong central gov., which must be fully representative, and must have command of foreign relations and of those internal matters which are of general concern, such as postal and telegraphic services, coinage and national defence. But this central gov. cannot administer innumerable local details over immense areas or among thickly populated tns. with varying interests; therefore each federal country or state must have a large share of autonomy. The adjustment of relations between principal and subordinate legislatures requires skilful statesmanship, and even when once arranged altering conditions and the growth of new ideas will sometimes raise fresh controversies.

The republic of Switzerland was first founded in 1307 by the men of Schwyz, Uri, and Unterwalden, and in about a century attained its present size, but remained communal rather than federal until 1848, when it was reorganised somewhat on its present lines. As the benefits of a solid gov. were realised, the powers of the federal parliament were strengthened in 1874, 1898, and again in 1907.

The medieval Ger. empire was a bulky and loose combination of states, sadly lacking in unity. It was broken up by Napoleon, but re-estab. with alterations in 1815. After the war of 1866 Austria was excluded, and in 1871 a federal empire was inaugurated at Versailles, with the King of Prussia as hereditary Ger. Emperor. The abdication of the Kaiser and the monarchs of the other Ger. states in 1918 led to the formation of the new republics of Prussia, Bavaria, Saxony, Württemberg, and others. But the Federation of the Ger. states remained in being, under a President (Field-Marshal Paul von Hindenburg, who assumed office in May 1925), and later under Hitler (*q.v.*), the last vestiges of autonomy of the sev. States of the Zollverein were merged in the Reich. For a thousand years the problem of unitarism versus federalism has been the main issue of Ger. hist. It has lost nothing of its poignancy under the quadripartite system of the occupying Powers and some indeed maintain that its solution is as important for the future of Central Europe as any decision made in the fields of economics or political education. But the problem of making federation living and workable is not confined to Germany. The adoption of federalist principles for the post-war reconstruction of the European Commonwealth was advocated by Mr. Winston Churchill as early as 1943 and some of his suggestions bear some resemblance to the rules of procedure embodied in the constitution of the Ger. Confederation.

Among the many national and geographical consequences of the First World War was the estab. of three new European countries which had many of the characteristics of Federated States. These were: (1) Poland, which, before 1939,

consisted largely of the ter. divided between Prussia, Russia, and Austria in 1772, and reconstituted as a nation after 1818; (2) Czechoslovakia, a number of states or parts of states, of which the old kingdom of Bohemia is the chief, including roughly the Slav populations that lie between Germany and Poland on the N. and Austria on the S.; and (3) Yugoslavia, consisting of the old kingdoms of Serbia and Montenegro, Croatia, Slavonia, and parts of the Banat, Bosnia, Herzegovina, Carniola, and Styria. Syria and Lebanon, consisting of the four states of Damascus, and Aleppo (*q.v.*), the Alaouites, and Lebanon are federated for certain purposes, but the constitution in each part is still in a rather unsettled condition.

The U.S.A. originally consisted of the thirteen colonies which united in 1775 to free themselves from Brit. rule; to these others have gradually been added. The struggle between centralisation and local autonomy has led to sev. great crises in their hist. Excessive claims of state sovereignty put forward by Kentucky and Virginia in 1798 and by S. Carolina in 1832 almost led to fighting, and in 1861 the great Civil war broke out over the same question, the S. states refusing to obey the federal gov., and claiming the right to secede.

Included in the Brit. Empire are three great federated colonies now called Dominions. The dominion of Canada was the first example in hist. of a free F. within an empire, free and autonomous, yet acknowledging the supremacy of the crown. The Commonwealth of Australia was constituted in 1901, the Union of S. Africa in 1909.

Brazil and Argentina are both federal republics, with constitutions resembling that of the U.S.A. (*See further infra.*)

Analysis and evolution of Federal Government.—The term 'federal government' is very loosely used in political discussion, but, generally, political scientists mean thereby an association of states, which has been formed for certain common purposes but in which the Member States retain a large measure of their original independence. They differ, however, about the particular form or type of association of states which they would appropriately describe as a federal gov. Hence the term has been applied, *e.g.*, to the old Austro-Hungarian Empire, the Ger. Reich of 1871-1918, the United States of America, the Union of S. Africa, the Commonwealth of Australia, various Lat. Amer. republics and the League of Nations—all of them associations of States, but each differing from the other in the form which that association has assumed. But the modern idea of what federal gov. is has been determined by the Constitution of the U.S.A. and many consider it to be the most important and certainly the most successful example; and in seeking a legitimate and convenient definition of federal gov., constitutional lawyers begin by examining the 'Federal Constitution' of the United States. The fundamental characteristic of the United States considered as an

association of states is that its Constitution establishes an association of states so organised that powers are divided between a general gov. which in certain matters—for example the making of treaties and customs tariffs—is independent of the gov. of the associated states, and, on the other hand, state gov. which in certain matters are, in their turn, independent of the general gov. It is important in this context to note the difference between the original Articles of Confederation of 1777 and the Constitution inaugurated ten years later. The difference lies in the fact that the present Constitution replaces the principle of the general gov. being subordinate to the regional gov. and dependent upon them, by the principle of the general and the regional gov. being co-ordinate and independent in their respective spheres. A similar evolution is observable in the case of some of the other associations mentioned above, which are often grouped with the gov. of the U.S.A. as examples of federal gov., *e.g.*, the Austro-Hungarian Empire which lasted from the *Ausgleich* or Compromise of 1867 until 1918. In 1867 Hungary, which had but little autonomy in the Hapsburg Empire, was granted a large measure of independence by the Emperor Francis Joseph and the Dual Monarchy or Empire of Austria and Kingdom of Hungary was estab. The Australian Constitution enacted in 1900 is an obvious illustration of a federal constitution. It estab. a gov. for the whole of Australia which, within a sphere, could exercise powers independently of the gov. of the states; while the latter, within a sphere, were enabled to act independently of the Commonwealth Gov. Neither the state gov. nor the Commonwealth gov. acting alone was authorised to alter the scope of the other's power as laid down by the Constitution. Both Commonwealth and State parliaments were to be limited in their powers, but not by each other; they were to be co-ordinate with each other but they were to be subordinate to the Constitution. Again, it is evident from a study of the Covenant of the League of Nations (*q.v.*) and from its practice, that it was a league of States and not of nations. Its organs, the League Assembly and League Council, were composed of representatives of the gov. of the Member States, and decisions upon most important matters were not binding upon a Member-State without its own consent. The Constitution of the Union of S. Africa embodies quite a different principle of association from those of the *Ausgleich* of 1867, the German Imperial Constitution, or the League of Nations, and it also differs from that of the United States and the Commonwealth of Australia. For in S. Africa the regional gov. were subordinate to the general gov. When the four self-governing colonies of S. Africa united in 1909 they set up a Parliament for the whole Union and four elective councils, one for each of the constituent provs. These Councils were empowered to make laws on a list of specified subjects set out in the Constitution, but these laws

were subject to the approval of the Union Gov. and were valid only in so far as they were not in conflict with an Act of the Union Parliament. Hence there is no question there of regional govts. being co-ordinate with the general gov. as in the United States or Commonwealth of Australia. It is evident, too, that the Union of S. Africa in its essentials is a unitary form of gov. and not federal though for some purposes it is often classed as a federal gov. The Swiss Constitution of 1848 follows the Amer. in many respects but in one matter at least it contains an important modification of the strict application of the federal principle: the courts must, under the Constitution, hold all laws passed by the Federal Assembly to be valid, though they may declare cantonal laws to be void as being in excess of authority. The case of Canada is unique: its Constitution, the Brit. N. America Acts 1867-1940, so divides the legislative powers between prov. and dominion legislatures as to give to the prov. exclusive control over a long list of enumerated subjects, while the dominion legislature enjoys exclusive control over the residuary subjects, which, 'for greater clarity' however, are also enumerated. In this respect the Canadian differs markedly from the Amer. Constitution: for according to orthodoxy, it is not sufficient that general and regional, provincial or state legislatures should each be independent in its allotted field; that field should be so mapped out that the residuary powers, as they are known, must lie with the regional or prov. govts. and, therefore, if this view be valid, then the Canadian is not a true federal constitution, whereas the Amer. Constitution is, for it precisely specifies the powers of the Federal Gov. and leaves the residuary powers to the States and, indeed, the same process, with modifications, is shown in the Commonwealth Constitution of Australia. In Canada neither the dominion nor the prov. legislatures has power to alter the Constitution so far as the distribution of powers is concerned. That power inheres in the Parliament of the United Kingdom alone. The Canadian courts may be called upon to declare dominion or provincial laws void for repugnancy to the Constitution and, thus far, the federal principle is rigidly applied. But the dominion executive has power to disallow any Provincial Act and may instruct the Provincial Lieutenant-Governor (who is appointed by the Dominion Gov.), to withhold his assent from Prov. Bills and to reserve them for the consideration of the dominion executive and may refuse assent to such reserved Bills. These powers of veto, as in essence they are, are all unitary elements in what is otherwise a strictly federal form of Constitution; they are matters in which the regional or prov. govts. are subordinate to the general or Dominion Gov. and not co-ordinate with it. Again, the Brazilian Constitution of 1891 also embodies the federal principle but (according to Prof. Wheare, a leading authority on federal gov.) there seems to be general

agreement among students of constitutional law that in practice its federal aspects were usually neglected. The Argentine Constitution of 1853, which remains substantially unaltered, is a federal constitution but here again the federal principle has not been applied substantially in practice. Prof. Wheare, says that from an analysis of the federal principle and its application to constitutions and govts. there emerges the conclusion that the countries which provide examples of federal gov. are the United States, Switzerland, Canada, and Australia; all others are merely quasi-federal. The test which he applies for federal gov. is simply this: 'Does a system of government embody predominantly a division of powers between general and regional authorities, each of which, in its own sphere, is co-ordinate with the others and independent of them? If so, that government is federal. It is not enough that the federal principle should be embodied predominantly in the written constitution of a country. That is something, but it is no guarantee that a system of federal government will operate. What determines the issues is the working of the system.'

We may briefly consider when federal gov. is appropriate. No doubt communities have been led to desire union from a variety of reasons. But in the modern federations some factors seem always to have been operative. These are: the need for a common defence; resentment of foreign interference and a realisation that independence can only be secured through union; some political association of the constituent communities prior to their federal union either in a loose confederation (*q.v.*), as with the thirteen Amer. States and the Swiss cantons, or as parts of the same Empire, as with the Brit. dominions; the hope of economic advantage, especially by way of protective tariffs; geographical propinquity; and similarity of political institutions. A consideration of these factors, all of which were operative in the case of America, Canada, Australia and Switzerland, may enable the student of constitutional hist. to decide how far a federal form of gov. can succeed with various communities, mainly Oriental, which to-day are struggling for independence: India, the States which form the Arab League, Brit. Malaya (or the Malayan Union), Indonesia; and Fr. Indo-China. While the above enumerated factors seem usually to have been present before the desire for union arose, it is instructive to find that some other factors are unexpectedly absent: thus community of language, or of race, of religion or of nationality have not been accounted as probable essential pre-requisites of the desire for union. No doubt common language or race contributed to union in the United States, Australia, and Germany, while common nationality also operated strongly in Italy and Germany; but, conversely, Canada and Switzerland provide striking examples of federations formed in spite of marked diversity of

language and race. (See K. C. Wheare, *Federal Government*, 1946.) See also CONFEDERATION.

Bibliography.—A. V. Dicey, *Introduction to the study of the Law of the Constitution*, 1885 (latest ed. by W. I. Jennings, 1939); E. A. Freeman, *History of Federal Government from the foundation of the Achaean League to the disruption of the United States*, 1863 (only one vol. of this projected work was pub., but a posthumous ed. in 1893 entitled *A History of Federal Government in Greece and Italy*, contains a new chapter on defective forms of federalism); A. P. Newton, *Federal and Unified Constitutions*, 1923, is a useful book of documents. Other useful works: H. E. Egerton, *Federations and Unions within the British Empire*, 1924, and W. I. Jennings and E. M. Young, *Constitutional Laws of the British Empire*, 1938, print the Canadian and Australian Constitutions with commentaries. A. Berriedale Keith, *Dominion Autonomy in Practice*, 1922, *The Constitutional Law of the British Dominions*, 1933, *The Dominions as sovereign states*, 1938, and cognate works, are essentially for the constitutional lawyer and practitioner. For other countries: UNITED STATES: J. Bryce, *The American Commonwealth* (1888)—supplemented by innumerable works such as C. A. Beard, *American Government and Politics* (4th ed. 1924), and W. R. Munro, *The Government of the United States*, 1936; M. Farrand, *Records of the Federal Convention* (4 vols., revised ed.), 1937, is a study of the making of the constitution. A. C. McLaughlin, *A Constitutional History of the United States*, 1935, and B. F. Wright, *The Growth of American Constitutional Law*, 1942, should be consulted on the law of the Amer. Constitution. SWITZERLAND: W. D. McCrackan, *Rise of the Swiss Republic*, 1901; W. E. Rappard, *The Government of Switzerland*, 1936; J. Schaffner, *A History of Switzerland*, 1915; and R. C. Brookes, *The Government of Politics of Switzerland*, 1920. CANADA: W. P. M. Kennedy, *Statutes, treaties and documents of the Canadian constitution 1713-1929*, 1930, *Essays in constitutional law*, 1934, and *The Constitution of Canada: an introduction to its development*, 1938; R. MacG. Dawson, *Constitutional Issues in Canada, 1900-1936*, 1937, and *The Report of the Royal Commission on Dominion-Provincial Relations* (known as the *Rowell-Sirois Report*). AUSTRALIA: W. Harrison Moore, *The Commonwealth of Australia* (2nd ed. 1910); K. F. Cramp, *The state and federal constitutions of Australia*, 1914; *Report of the Royal Commission on the Constitution*, 1929 (minority report advocated greater unification, the majority report accepted federalism); G. V. Portus, (ed.) *Studies in the Australian constitution*, 1933; A. O. V. Melbourne, *Early constitutional development in Australia, 1788-1866*, 1934; and Sir G. S. Knowles, *The Commonwealth of Australia Constitution Act*, 1936. On federal finance consult B. P. Adarkar, *The Principles and Problems of Federal Finance*, 1933, and G. F. Shirras, *Federal Finance in Peace and War*, 1944, analyses

the national economy of the U.S.A. and the federal govts. of the Brit. Commonwealth and India, their national income, expenditures and revenues, public debts, etc., and deals with the conflicts in inter-governmental financial relations and their solution).

Federation of British Industries. Estab. in 1916, and granted a Royal Charter of Incorporation in 1924, the F.B.I. is 'a voluntary association of Manufacturers and Producers for the promotion of their sev. and mutual interests, governed by an annually elected Grand Council.' It exists in order to encourage and develop Brit. manufs., and to safeguard the interests of Brit. producers both at home and abroad. It is entirely non-political. The F.B.I. collates the views of manufacturers on many points, e.g., taxation, factory legislation, shipping freights, smoke abatement and riv. pollution; these it presents in the proper quarter with the weight of organised industry behind it. It also assists its members by giving expert advice on numerous trade points, such as advertising, contracts, customs, exhibitions (the Brit. Industries Fair is held annually in London and Birmingham), fuel economy, insurance, overseas market. It issues four pubs.—the *F.B.I. Register*, the official list of members and also a comprehensive list of Brit. manufacturers, with a list of products, under 5000 headings; *British Industries*, its monthly organ, with a *Taxation Supplement* and an *Economic Supplement*; the ann. *Fuel Economy Review*; and the quarterly *F.B.I. Business Barometer*. The F.B.I. maintains a staff of experts on all points at its London headquarters in Tophill St., Westminster, London, S.W.; and it has representatives in nearly one hundred centres throughout the world.

Federici, Camillo (1749-1802), lt. dramatist, whose real name was Giovanni Battista Vlassolo, b. at Garesio in Piedmont. He was educated at Turin, and spent the early part of his life on the stage, but in 1778 settled at Padua and devoted himself to literature. He acquired a great reputation by his comedies, most of which were melodramatic in character. His complete works were pub. in 1816, and another ed. in twenty-six vols. at Florence in 1826.

Federzoni, Luigi, lt. journalist and statesman; b. 1878, at Bologna; son of Giovanni F. Edited *Resto del Carlino*, 1903-04; moved to Rome; directed foreign dept. of *Giornale d'Italia* from 1905; from 1913 ed. *Idea Nazionale*. In First World War, an artillery officer. Founder of lt. nationalist movement, led its merger into Fascism in 1922. Deputy, 1913. In 1922, first colonial minister under Mussolini; in 1924, minister of interior; in 1926, colonial minister again; in 1928, minister of interior again, and senator. In 1929, elected President of the Senate. Wrote *L'Africa Romana* (1929).

Fedor I., R. III., see FEODOR.

Fedra, see L'EGIRAMI, TOMMASO.

Fee, Fee Simple, and Fee Tail. F. (from Lat. *feodum*) is the same as fief or feud, and means an estate (q.v.) or interest in

land which can descend to the heir, or, in other words, a freehold estate of inheritance. In the feudal system of land tenure, under which there was a gradation of tenants in fee simple up to the supreme landowner, the king, the word was used in opposition to 'allodial.' Allodial land was land granted absolutely in perpetuity by book or charter (*hoc land*). Feudal land, on the other hand, was theoretically 'property lent,' and was held subject to the performance of the various feudal incidents, such as knight service and the payment of aids. An estate in fee simple means an interest in land descendible at the common law to the heirs general of the preceding tenant. Generally speaking the tenant in fee simple is the absolute owner in perpetuity. A tenant in fee simple can dispose of his land by deed or will for any interest and to whom he pleases. An estate in fee tail is a F. which is limited in its descent to the issue of the tenant. A qualified or *base F.* is created where a tenant in tail, not yet in possession, bars the entail by deed without first obtaining the consent of the protector. *See also* ENTAIL.

Fee Law, see FIEF.

Feeble-minded, see MENTAL DEFICIENCY ACTS.

Feeding, see FOOD AND FEEDING.

Feeling comprises all our pleasures and pains, together with states that are indifferent as regards pleasure or pain, and are characterised simply as excitement. Under the muscular F.s. and the sensations are detailed all the susceptibilities of a primary character, due, on the one hand, to the putting forth of muscular energy, and on the other to the operation of the outer world on the organs of sense. There remains a large dept. of secondary, derived, or complicated F.s., termed the emotions. F. proper may be divided into (1) Formal and (2) Qualitative. The former comprises oppressions, relief, harmony, and contrast, and the more elementary formal F.s., and also the more complicated F.s., e.g. hope, apprehension, doubt, tedium. The second division includes the lower F.s., or those of sense-pleasures and pains of colours and sounds, and the higher or intellectual F.s., the æsthetic, the moral, and the religious. The modes of derivation or composition of the emotions depend on contiguous growth or the associating process. Association operates in uniting together a number of separate F.s. into one whole, which is then connected with a special object, as in sexual love. *See also* EMOTIONS.

Fees: Architects' fees.—These will, in general, be fixed by express agreement. Where there is no express agreement an architect is entitled to reasonable remuneration, depending on the nature of the work to be executed. It is usual in express agreements to pay a commission varying according to the cost of the expenditure. The customary rates are well recognised, and will usually govern cases where there is no express agreement. This rate is six per cent on work costing £2000 rising on a graduated scale to ten per cent

on £100. This covers the preparation of plans and specifications, certificates for the builder, and measurements, etc. But where the work requires more than ordinary skill, such as in the case of alterations to existing buildings, designs of high-class fittings and furniture for a mansion, an architect is entitled to charge a higher rate. Where the plans are not used, it is customary to charge one quarter of full fees, if the work is only approximate and without plans. But where drawings sufficient for quantities to be estimated and a tender to be invested have been prepared, it is usual to charge two-thirds of full fees. In addition, the architect is entitled to his travelling expenses. Where the architect prepares bills of quantities, i.e. estimates of the labour and material required, he may claim an additional commission. (*See Quantity Surveyors*, p. 610). Where no works are carried out the remuneration is generally by the day, varying with the reputation of the particular architect. Three guineas a day is considered the minimum F. for a man of fair standing, and is generally allowed by taxing masters. The professional charges of architects are dealt with in rules issued by the Royal Institute of British Architects.

Clerical fees.—These are due principally in respect of marriages and burials. Where the marriage is by banns, the F. for the pub. of the banns is about 12s. 6d. in most parishes. In the case of a marriage by licence the F. varies according to the kind of licence. Banns are not necessary where the marriage is by bishop's licence. Such licence is to be obtained at the Vicar-General's office, 3 Creed Lane, Ludgate Hill, London, E.C., or at 1 Dean's Court, Doctors' Commons, E.C., at a cost of between £2 and £3. In country dists. a bishop's licence may be obtained at the offices of the bishop's registrars, or through his surrogates or deputies. When the marriage is by special licence of the archbishop of Canterbury, the F. for the licence stamp, etc., is £25. Such licence can be had on application, through a proctor of the Faculty Office, Doctors' Commons, and enables the marriage to take place anywhere and at any time. The cost of a registrar's certificate, where the marriage is to be so authorised, is 7s. where the parties live in the same dist., and 9s. if they live in different dists., the F. for a registrar's licence is £2 12s. 0d. where the parties desire to be married by licence. There are also F. payable to the incumbent on the solemnisation of the marriage itself when the marriage takes place in a church. There is no fixed scale, the rate being according to the custom of the particular church. Marriage F. are not uniform, and if excessive, there is power with the Diocesan Chancellor to moderate them. The minimum F. are generally one guinea to the clergyman and 5s. to his clerk or vergers. In poor dists. the charges are lower. A copy certificate of the marriage may be obtained at Somerset House for 2s. 7d. The marriage register may always be inspected on payment of 1s. Burial F. are by custom due

to the incumbent, but they can only be recovered in an eccles. court, for the common law does not recognise such F. Statutory Burial F. are, however, recoverable in the ordinary courts, where no express enactment provides for their recovery in the eccles. courts. A customary burial F. to be recoverable, must be of a fixed amount and reasonable. There may also be F. payable by custom for monuments and vaults. Tables of F. for burials may be fixed for any parish by the eccles. commissioners (q.v.) with the consent of the bishop of the diocese. A minister and his sexton are also entitled to F. for services in connection with a burial, the rate of such F. being in accordance with tables approved by a secretary of state. F. are not ordinarily payable for baptisms; but both on those occasions and on the ceremony of 'churaching of women' it is usual to make a gift or offering. See Sir R. Phillimore, *Ecclesiastical Law*, 1873, and Little's *Law of Burial*.

Engineering.—In both lump sum and schedule contracts, the percentage charges are half those for architectural work, but the same scale applies in respect of charges based upon time.

Legal fees.—In a wide sense legal F. means any F. provided for by law. In a narrower or technical sense it is practically equivalent to costs. Costs for legal work done may relate either to non-contentious or to contentious work. As in the medical profession, there is a recognised scale for a solicitor's remuneration, but a solicitor and his client may make a special agreement as to costs. In the case of contentious business the solicitor is not entitled to his costs until the bill has been submitted to the Taxing Master's office for approval (see Costs). The items to be seen on a solicitor's bill of costs usually make a formidable total, but the greater part is incurred for counsel's F., witnesses' expenses, and the preparation of documents for the hearing; so that in reality the profit of the solicitor is far below what is commonly supposed, especially when the time spent in the incidental work of preparing a case is borne in mind. The customary F. for a solicitor's attendance is from 6s. 8d. to one guinea a visit, according to the nature of the business and the time taken. Included in the bill of costs which a litigant (whom the court has ordered to pay the costs of legal proceedings) will have to meet, will be court F. (the F. and percentages will be found in either the *Annual Practice* or the *Yearly Practice* in the schedule to the *Order as to Court Fees*). These include, *inter alia*, F. on a writ of summons in the King's Bench Div. or, in

the Chancery Div., an originating summons, for the commencement of an action (30s.); entering appearance on a summons (2s. 6d.); on taking an affidavit (2s. 6d.); filing a notice of motion (5s.); presenting, in the Chancery Div., a petition to a cause or matter (£1) and answering a petition (£1); entering a judgment, decree or order given or directed or made in the trial of a cause (£2), or, in an undefended matrimonial suit (£1); entering a judgment pursuant to an order or certificate made in chambers (10s.). All these F. are payable ultimately to the Inland Revenue authorities in the form of stamps. A solicitor must submit his bill to the client before he is entitled to sue for his costs, and this whether it relates to contentious or non-contentious work.

Conveyancing (q.v.) and CONVEYANCE F. form one of the most remunerative sources of a solicitor's profits. There are two scales of conveyancing F., depending on whether the title to the land is or is not registered under the Land Registration Act, 1925. Solicitors' scale F. (where the title to the land is *not registered*) (a) as vendor's or mortgagor's solicitor for deducing title, and perusing and completing conveyance or mortgage (including preparation of contract, or conditions of sale); or (b) as purchaser's or mortgagee's solicitor for investigating title and preparing and completing conveyance or mortgage (including perusal and completion of contract) are on a sliding scale according to the consideration money (i.e. purchase, sale, price, etc., of the land.) The following table gives examples of the F. :—

CONSIDERATION MONEY	SCALE FEE
	£ s.
Under £100	4 10 (minimum fee)
£100 to £300	7 10
£300	22 10
£500	67 10
£10,000	105 0
£20,000	142 10
£30,000	130 0
£40,000	217 10
£50,000	255 0
£100,000	295 0

Rack Rent Leases.—Lessor's solicitor's F. (whether or not the title to the land is registered) for preparing, settling and completing the lease or agreement for a lease, and counterpart, at a rack rent (other than a mining or building lease) are on a scale of which the following rates are an example :

ANNUAL RENT

£65 and under
£70
£80
£100
£100 to £500

Above £500

LESSOR'S SOLICITOR'S SCALE FEE

(minimum) £7 10s.
£7 17s. 6d.
£9
£11 5s.

£11 5s for the first £100 rent, and at the rate of 3s. 9d. for every subsequent £5 of the rent.
£11 5s. for the first £100 rent, 3s. 9d for each subsequent £5 up to a total of £500, and at the rate of 1s. 6d. for every subsequent £5 of the rent.

Long Leases.—Lessor's or vendor's solicitor's F. (whether or not the title is registered) in respect of a building lease reserving rent or other lease for a term of 35 years or more at a rack rent are on a sliding scale as under :

ANNUAL RENT

£5
£50
£100
£500
£1000

Above £1000 at the rate of 7s. 6d. for every subsequent £5 of the rent.

VENDOR'S OR LESSOR'S SOLICITOR'S SCALE FEE

(minimum) £7 10s.

£21
£28 10s
£62 5s.
£99 15s.

Solicitor's F. on sales, purchases or mortgages of registered land.—Solicitor's F. (where the title to the land is registered with an absolute or good leasehold title under the Land Registration Act, 1925) for every completed transfer on sale, and on every charge, mortgage or transfer for value thereof are on a sliding scale, of which the following are selected examples :

VALUE OF LAND OR AMOUNT OF CHARGE

SCALE FEE

	£	s.	d.
£100 and under	2	5	0
£500	5	12	6
£1000	11	6	0
£5000	33	15	0
£10,000	48	15	0
£20,000	63	15	0
£30,000	78	15	0
£40,000	93	15	0
£50,000	108	15	0
£100,000	122	10	0

In transactions between £50,000 and £86,250 (inclusive) the amount chargeable is the same as on £50,000. Where the land is registered with a possessory or qualified title (*see* REGISTRATION OF TITLE) and no title excluded from the effect of registration is investigated, the above scale applies. If such excluded title is investigated the solicitor's charges for the transaction are by items. (Land Registry F. are payable to the Land Registry and do not form part of the solicitor's remuneration, to which they are additional.) In a conveyancing transaction, where a title is absolutely clear, the work involved is almost purely a matter of drawing and engrossing according to precedent. In these cases the client will be well advised to make some special arrangement.

There are scales of F. for drawing and perusing deeds, wills, or other documents. Generally these F. are 2s. per folio for drawing up the document, 8d. per folio for engrossing (*i.e.* copying out in a clear hand for preservation) and 1s. per folio for perusing. The F. for drawing each sheet of eight folios of an abstract of title (*i.e.* the list of the title to the particular land; *see* VENDORS AND PURCHASERS) is 6s. 8d. A solicitor is also entitled to a F. of 5 guineas daily for every day of not less than seven hours employed on the business of or in travelling for his client. The F. mentioned in this paragraph are basic

scales and subject to an increase of 33½ per cent.

Counsel's F. are fixed entirely according to the arrangement between themselves and the solicitors who employ them. It is customary to include in counsel's F. an

amount for his clerk according to a sliding scale varying from 2s. 6d. on a brief F. under 5 guineas to £2 10s. on a F. of 50 guineas or upwards. The clerk is entitled to sue the barrister for his F., but a barrister may not bring an action against anyone to recover his F., which are legally regarded as being in the nature of *honoraria*. The allowance for counsel's F. is entirely in the discretion of the taxing master. Separate F. are in general allowed for conducting a suit (the 'brief F.'), advising, settling pleadings, consultations, conferences, and commissions to take evidence abroad. Where a case extends over a day a 'refresher' may be allowed by the taxing master. A junior counsel customarily receives a F. equal to two-thirds of that of the leader. *See* Scott on Costs, *Annual Practice*, *Yearly Practice of the Supreme Court*. *See also* COSTS.

Medical fees.—These may be conveniently considered according as they are in respect of attendance on private patients, or by way of remuneration for attendance at the request of the police or to give evidence in a court of law. **Fees for attendance on private patients.**—The F. of a general practitioner are by the etiquette of the profession fixed on a sliding scale based on the income of the patient as indicated by the rental of his house. 'Special' visits are charged for at the rate of a visit and a half, a special visit being where notice to attend has not been given to the practitioner before starting on his daily round. In the case of houses of £10 to £25 rentals the F. for ordinary visits is from 5s. to 7s. 6d.; £25 to £50 from 5s. to 10s. 6d.; £50 to £100, from 7s. 6d. to 15s., and similarly where the patient visits the practitioner. Night visits are charged at double the rate of ordinary visits. The scale for detention per half hour is at the same rate as for ordinary visits. There is also a mileage charge varying from 2s. 6d. to 4s. The minimum F. for a consultation is 21s. In every case, but the F. generally charged by a consulting physician or surgeon is 3 guineas a consultation, or 2 guineas for the first and 1 guinea for each subsequent consultation. If the consulting physician or specialist calls upon the ordinary medical practitioner to meet him in consultation, the practitioner is entitled to charge double his ordinary F. as given above. The F. for a certificate of health is at the same

rate as for an ordinary visit. The charge for attendance on a servant is the same as that for the master, if the attendance was at the latter's request. The Insurance Acts deprive this convention of most of its force, as servants are entitled to medical benefits under the Act, and to be attended by a 'panel' doctor. The above customary rates apply in the absence of any express agreement between the patient and the doctor. A specialist, consulting physician, or practitioner can, of course, charge what he chooses if the patient agrees beforehand to pay such charge. No doctor on a hospital staff may receive a F. for work done at the hospital, any F. paid by hospital patients are payable to the hospital itself. Medical men may now sue for the F. by virtue of the Medical Act, but they must prove registration as a medical practitioner and possession of a diploma from a recognised examining body. The bye-laws of the Royal Colleges of Physicians and Surgeons prohibit a *fellow* from bringing an action, but such prohibition extends to no one else. Under the National Insurance Act (1946), insured persons entitled to medical benefits escape all liability for F. and cost of drugs. The medical practitioner on the panel for a specified area looks for his remuneration to the National Insurance Fund, and the amount, which is payable quarterly, includes a rate fixed by the commissioners in respect of each insured person on the practitioner's list, and other rates for various services rendered. Doctors (and dentists) who have joined the comprehensive National Health Service system (see NATIONAL HEALTH SERVICE), set up by the National Health Service Act, 1946, are not debarred from receiving fees from patients who do not take advantage of the State scheme. Capitation remains the main source of remuneration (as under the various National Insurance Acts) of doctors who join the State health service, but there is also a basic salary.

Fees of medical witnesses.—F. under Coroners Acts, 1887-1926: (a) for attending to give evidence at any inquest where no post-mortem examination has been made by the practitioner, for each day's attendance, £1 11s. 6d.; (b) for making a post-mortem examination and reporting result to coroner, without attending to give evidence at an inquest, £2 2s.; (c) for making a post-mortem examination and reporting result to coroner and for attending to give evidence—for first day, £3 3s. and for each subsequent day, £1 11s. 6d. No provision is made for mileage. F. in other courts—Home Office Orders in respect of witnesses giving professional evidence, provide as follows: there may be allowed to practising members of the medical (and legal) profession for attending to give professional evidence, allowances not exceeding the sums stated in the following scale: for attending to give evidence in the town or place where the witness resides or practises: if he attends to give evidence in one case only, not more than one and a half guineas a day; if he gives evidence on the same day in two or more separate and distinct cases, not more

than 3 guineas. For attending to give evidence elsewhere than in any town or place where the witness resides or practises, whether in one or more cases, not more than 3 guineas a day. Travelling allowances are also made for attending court from a distance of over 2 m. F. in Higher Civil Courts: in the Supreme Court of Judicature and in the Court of Appeal, a medical witness is allowed 1 guinea a day if resident in the city where the case is tried, and 2 guineas to 3 guineas if resident at a distance from the place of trial, inclusive of all except travelling expenses. For travelling expenses he is allowed a sum not exceeding 3d. per m. each way if there be a railway, and 6d. a m. each way if there be no railway. The basic scale of F. in co. courts, where witnesses may refuse to give evidence unless paid their expenses is 15s. for time given and 1 guinea a day for hotel expenses, for ordinary evidence as distinct from expert evidence; in the latter case the F. are from 1 guinea to 3 guineas for time given, and 1 guinea to 5 guineas a day for expenses. According to the 'Rules of the Supreme Court,' an expert medical witness in the High Court is entitled to a basic fee of 7 guineas a day for reading up a case in order to give evidence; but in most cases, of course, the remuneration is fixed by the parties calling the witness before the case comes on.

Under the Workmen's Compensation Acts, there is a statutory scale of F. payable to the medical practitioners acting as medical referees in cases of accidents to workmen.

Dental.—Extractions, fillings, scalings average 12s. 6d.-15s. each operation, for private patients. Dentures may cost any sum up to £30 or more. Dentists' professional expenses, including as they do mechanics' wages and the cost of dentures, are necessarily heavy. The present scale of F. accepted by the Ministry of Health for the National Health Service for dentists who join the service, is designed to produce £3858 gross a year—the sum recommended by the Spens Committee for an efficient dentist making full use of all appropriate assistance. The official scale is based on the average times taken for the various dental operations. By a regulation of the Ministry of Health (operating from Feb. 1, 1949) limiting the earnings of dentists, taking part in the National Health Service, the earnings of dentists will be paid in full up to £4,800 gross in a calendar year, but further earnings beyond this figure will be reduced by half. See also under DENTISTRY.

Accountants' Charges.—The following scale of F. is generally applicable, but for special work. F. are usually a matter of negotiation. For company audits, the F. is fixed by shareholders in general meeting. For preparing balance sheets, investigating accounts, etc., 5 to 10 guineas per day of 7 hrs., of principals' time; 3 to 5 guineas in the case of managing clerks (if chartered or incorporated accountants), 1½ to 2½ guineas (if not chartered, etc.); other clerks, 1 guinea and upwards. Receiver, liquidator and

trustee in bankruptcy, are usually paid a percentage on realisation of assets and dividends paid.

Quantity Surveys.—The customary charge as for preparing Bills of Quantities is $2\frac{1}{2}$ per cent on the estimated cost of the work up to £10,000, and 2 per cent above that amount, together with $\frac{1}{4}$ per cent for pricing out estimates; 4 per cent for measuring variations on contracts (i.e. $2\frac{1}{2}$ per cent upon the amount of gross additions and $1\frac{1}{2}$ per cent on gross omissions); $\frac{1}{4}$ per cent for preparing approximate estimates; and $\frac{1}{4}$ per cent upon the amount of the valuation, for surveying work in progress.

Stock-Brokers' Charges.—Stock-brokers' charges are fixed by the committee of the Stock Exchange, and vary considerably for different classes of stocks and shares. The usual charge on the most important securities is $\frac{1}{4}$ per cent, rising to one half per cent, in a few instances, with a minimum fee of ten shillings on less than £100 and twenty shillings on over a £100. The charges on buying and selling shares also vary, being mostly based on a fee of one penny on each ten shillings, with the same minimum as above.

Auctioneers.—For freehold and other leased property: on the first £300, 5 per cent; on the next £4700, $2\frac{1}{2}$ per cent; on the residue $1\frac{1}{2}$ per cent. The charges for selling chattels, stock, and effects are 5 per cent on the first £500, and $2\frac{1}{2}$ per cent on the residue. Special arrangements are usually made in relation to non-sales or subsequent sales. The charge for selling furniture, stock-in-trade and other goods on the vendor's own premises is 5 per cent on the amount realised, plus agreed costs for printing and advertising. The charge for selling horses and pedigree live stock is 5 per cent. Other live stock is $2\frac{1}{2}$ per cent, dead stock 5 per cent.

Estale Agency.—Sales by private treaty: First £300, 5 per cent, next £4700, $2\frac{1}{2}$ per cent; on the residue $1\frac{1}{2}$ per cent. Purchases: one half the scale for selling. If no purchase is effected the usual scale for valuation is charged, which is: £1 10s. per cent on the first £1000, 10s. 6d. per cent on the next £9000, and 5s. 3d. on the remainder, with a minimum fee of £5 5s.

Fehling's Solution, solution which is used for the detection and estimation of glucose and other 'reducing' sugars. It consists of a solution of cupric sulphate mixed with alkali and potassium-sodium tartrate. For use a small quantity of the solution is placed in a test tube and diluted with water. It is then boiled for a few seconds, after which the fluid to be tested is added drop by drop until its bulk is equal to that of the diluted fluid. If a reducing sugar (such as glucose but not sucrose, cane-sugar) is present a yellow precipitate of hydrated cuprous oxide is thrown down, which subsequently loses its water of hydration, and becomes reduced to ordinary red cuprous oxide.

Fehmarn, or Femern, is in the Baltic Sea, which belongs to the Ger. *Land* of Schleswig-Holstein, and is separated from the N.E. corner of Holstein by a channel one m. in breadth. It has an area of 73

sq. m., and is very fertile. Though bare of forest, corn is extensively grown and cattle are reared in the pastures. The fisheries form the chief industry. Burg is the cap. Pop. 12,000.

Fehmle Courts (Old High Ger. *feme*, court of justice), tribunals, often, but not always, secret, which became renowned in Westphalia about the twelfth century, and afterwards spread throughout Germany. They were composed of free citizens leagued together against feudal tyranny, and acknowledging no jurisdiction but their own. Important cases were tried in secret, when none but inflated members might attend, and the only permissible sentence, *death*, if pronounced, was certainly carried out, no culprit, however powerful, being secure. Implicit obedience was exacted from all members, who were known to each other by secret signs. See T. Lindner, *Die Feme*, 1888; C. W. Scherer, *Die westfälische Feme-gerichte und die Widenossenschaft*, 1941; and Scott's *Année de Geisteswiss.*

Fehrbellin, tn. of Brandenburg, Germany, situated 33 m. N.W. of Berlin. It was the scene of a battle in 1675, when the Prussians, under Prince Friedrich of Homburg and his marshal Derfflinger, defeated the Swedes under Wrangel. Pop. 2000.

Fehrenbach, Konstantin (1852-1926), Ger. statesman; b. at Wellendingen, Baden. In 1882, a lawyer in Freiburg. Sat, 1885-87 and 1901-13, as member of centre, in second chamber of Baden, over which he presided 1907-09. From 1903, in Reichstag of which he became President in June 1918. Presided over National Assembly, Weimar, Feb. 1919. Became Chancellor at head of minority gov., June 1920. Took part in conferences at Spa (July 1920) and London (March 1921). As refusal of reparations-demand led to 'sanctions,' F.'s cabinet gave place to Wirth's. In March 1924, F. became chairman of his party.

Fehrmann, Minny, see BREMA, MARIE. **Feijoo y Montenegro, Benito Jeronimo** (1676-1764), Sp. scholar. Became a Benedictine monk at the age of twelve. He is regarded as the initiator of educational reform in Spain. He boldly attacked the dialectics and metaphysics then taught everywhere in his native country; maintained Bacon's system of induction in the physical sciences. He pub. *Teatro critico universal* (1751-59), and *Cartas eruditas y curiosas* (1753).

Felding, Robert (1651-1712), known as 'Beau Felding,' was a member of the Denbigh family, and attached to the court of Charles II. He was noted for his numberless amours, his extravagance, and his profligacy. According to Swift, he married Mary, daughter of Barnham Swift, and wasted her fortune. He was given a regiment by James II., and later became a Rom. Catholic and followed James to Ireland.

Felding, Rudolf Robert Basile Aloysius Augustus, see DENBIGH, EARL OF.

Felding, tn. in N. Is., New Zealand, 99 m. N.E. from Wellington. It has dairy factories, freezing works, and flour mills. Pop. 4700.

Feint, see DEMONSTRATION, MILITARY.

Fels (**Fhels**), name of various assemblies in Ireland. The F. of Tara, which originated seven centuries before Christ, was mainly a national and political assembly, and was due to meet every third year for the purpose of 'preserving the laws and rules, but might be called at other times. It was presided over by the Ard-Rig, and consisted of the prov. kings and other distinguished men of Ireland, e.g. poets, historians, etc. After the proclamation of the laws the proceedings were festive in character. The last regular F. was held at Tara in 560 A.D.

Faisal (**Faisal**), King of Iraq (1883-1933), b. at Rahab, near Taif; son of Husain ibn Ali—afterwards Grand Sherif and Emir of Mecca, and, later, King of the Hedjaz; descended from Hasan, eldest son of Mohammed's daughter Fatima. In 1913 he became deputy for Jiddah in the Turkish parliament, and took part in the Arab national movement. He was at Mecca when the First World War broke out. With one of his brothers, he raised the flag of revolt near Medina, June 13: and, having failed in an attack on that city, he became chief of his father's N. army. His forces, co-operating with Allenby, marched from Medina to the E. bank of the Jordan. He met Allenby Oct. 3, 1918, and the same day rode into Damascus in celebration of the overthrow of Turkish power in Syria. He attended the Peace Conference in Paris, Feb. 1919.

In March 1920 he was back in Damascus; where his appointment as King, and the independence of Syria, were proclaimed. But, next month, Syria was 'mandated' to France; and either F.'s appointment was unpopular, or opponents contrived to make it seem so (he had publicly expressed sympathy with Zionism); and Fr. troops entered Damascus July 25. F., deposed, left for Haifa, and began to turn his attention to Mesopotamia, otherwise Iraq; for the throne of which his brother Abdullah (now King of Transjordan) had hitherto been a somewhat passive candidate. A referendum of Iraq notables resulted in a huge majority for his election: he was enthroned King, Aug. 23, 1921. In 1927 he came to London to negotiate the admission of Iraq to membership of the League of Nations. The Brit. Gov., as Mandatory, had by then substituted a treaty arrangement with Iraq in place of the mandatory regime, but full independence and membership of the League did not come until 1930, when a new Treaty of Alliance was concluded between Iraq and Great Britain. F. died in Switzerland and was succeeded by his son Ghazi, who was killed in a motor accident in 1939. See Sir T. Comyn-Platt, *King Faisal of Iraq*, *Empire Review*, Nov. 1926; Mrs. Stewart Erskine, *King Faisal of Iraq*, 1933; Sir H. Young, *The Independent Arab*, 1933. See also IRAQ.

Felth, Rhijnwils (1753-1824), Dutch poet and writer, b. at Zwolle in the Netherlands. He was educated at Harderwijk and at the Univ. of Leyden, and became mayor of Zwolle in 1780. He wrote novels, which have been very much criticised for their morbid melancholy, as well as

tragedies, didactic poems, and lyrics. Of his novels may be mentioned *Julia* (1783), and *Ferdinand and Constantia* (1785), both of which are written in emulation of *Werther*, and his best tragedies are: *Thirza* (1784), *The Patriots* (1784), *Lady Jane Grey* (1791), and *Inez de Castro* (1793). Among his poems are: *Old Age* (1802), *The Grave* (1792), a didactic poem, and *Odes and Miscellaneous Poems* (1796-1814).

Felaniche, or **Felanitz**, tn. in Majorca, Balearic Isles, Spain, situated 27½ m. S.E. of Palma. Fruit is extensively cultivated and wine is manuf. There is also a trade in cattle. Pop. 12,000.

Feldkirch, tn. of Austria and the cap. of the Vorarlberg dist. It is situated about 6 m. above the junction of the Rhine with the Ill. It has engineering works, bell foundries, and cotton and paper mills; Kirschwasser is manuf. F. previously occupied a strong military position, and is the seat of sev. administrative offices. Pop. 12,900.

Félegyháza, or **Kiskunfélegyháza**, tn. of Hungary, situated 65 m. S.E. of Pesth, on the railway between that city and Szegedin. It is a centre of a vine growing dist., and there are extensive orchards. Corn and tobacco are cultivated. Sev. Rom. relics have been unearthed in the neighbourhood. In the seventeenth century the tn. was destroyed by the Turks: it was rebuilt in 1743. Pop. 34,000.

Félibien, André (1619-1695), Fr. architect and historiographer, b. at Chartres. Went to Rome as Secretary to the Fr. ambas. and, while there, came upon a life of Plus V. in the library of Cardinal Barberini, which he trans. This seems to have started him in his career as a writer on artistic subjects. With the patronage of Colbert and Fouquet, he was successively historiographer of buildings, secretary of the Académie d'Architecture, and keeper of antiquities; but he devoted most of his life to writing. His *Entretien sur les vies et sur les ouvrages des plus excellents peintres anciens et modernes* (1686) won the praise of Voltaire. Another notable work was his *Description de l'Abbaye de la Trappe*, trans. into Eng. in 1871.

Felidae, name given to an extensive family of carnivorous mammals, of which nearly all the existing members may be included in the genus *Felis*. They are characterised by a little body, soft and often beautifully marked fur, feet provided with cushion-like pads and retractile claws, and short, strong jaws with formidable teeth. *F. domesticus*, the domestic cat, and *F. leo*, the lion, are typical and widely contrasted species; others are *F. tigris*, the tiger; *F. pardus*, the leopard; *F. onca*, the jaguar; *F. concolor*, the puma; *F. catus*, the European wild-cat, and *F. maniculata*, also termed *F. castra*, the Egyptian cat, which is regarded as the parent of our own domestic species. *Lynx*, sometimes termed *F. lynx*, is more frequently regarded as a distinct genus of Felidae, with *L. pardinus*, the pardini lynx, and *L. canadensis*, the Canadian lynx, as the most familiar species. (See illustration, p. 612.)

Felis (the cat genus), *see* CARNIVORA, CAT, FELIDÆ, LEOPARD, and TIGER.

Felix, name of five popes: *Felix I.*, bishop of Rome, who reigned from 269 to 274. He is said to have suffered martyrdom in the persecutions under Aurelian. *Felix II.*, anti-pope, was raised to the papal chair in 356 on the banishment of Liberius, who refused to condemn Athanasius, but was expelled from Rome on his return in 357. He was regarded as a saint and martyr, and died in 365. *Felix III.*, pope, ancestor of Gregory the Great, succeeded to the papal chair in 483 and held it until his death in 492. He excommunicated the Patriarch of Constantinople, and so produced the first

and was the brother of Regula, who was also regarded as a saint. Both brother and sister suffered for their religion, and the former was beheaded on the site of the great cathedral.

Felixstowe, tn. of Suffolk, England, which is usually considered as having derived its name from a Priory dedicated to St. Felix, Bishop of Dunwich, is situated on a peninsular between the rivs. Orwell and Deben in the S.E. of the co. It is a well-known seaside resort, much frequented on account of its cliff gardens, fine beach, and boating and bathing facilities, 12 m. from the co. tn. of Ipswich. It adjoins Harwich harbour, which was an important centre of naval activity dur-



LION (*Felis Leo*)

schism between the E. and the W. Church. *Felix IV.*, pope (526-530), was elevated to the papal see by Theodoric, contrary to the wishes of the clergy and people. *Felix V.* was the name assumed by Amadeus VIII. (1383-1451), when he was elected pope in 1439. He succeeded as count of Savoy in 1391, and was created duke in 1416, but retired to a hermitage by the Lake of Geneva in 1434, and three years later became pope, reigning as Felix V. (1429-49). He died at Geneva.

Felix, Antonius, Rom. procurator of Judea, was a freedman of Antonia, mother of the Emperor Claudius I., or of the emperor himself. He married Drusilla, daughter of Agrippa I., and wife of Azizus, King of Emesa, whom he induced her to desert, and procured the assassination of the high priest Jonathan, who had offended him by unpalatable advice. St. Paul was sent to be judged before Felix at Caesarea, having there preached of righteousness, temperance, and judgment to come, and was kept in custody for two years.

Felix, St., patron saint of Zürich, whose feast is celebrated on Sept. 11. He flourished at the beginning of the third century,

ing the First and Second World Wars, and it has also an R.A.F. sea-plane Station, from which the pioneers of the sea-plane made their first flights, and at which many new aircraft have been tried out. It is the headquarters of the Felixstowe Ferry Sailing Club, and there are ten other Yacht Clubs within 20 miles. Pop. approx. 12,000.

Fell, John (1625-86), English divine, son of Samuel F., dean of Christ Church, Oxford. He was b. at Longworth, Berkshire. In 1636 he gained a studentship at Christ Church and took orders; deacon, 1647; priest, 1649. During the Civil war he held a commission as ensign for the king, and at the restoration was made dean of Christ Church and chaplain to the king. In 1676 he was consecrated bishop of Oxford, also holding the deanery of Christ Church *in commendam*. He was an extraordinary disciplinarian, encouraged learning, and proved himself a capable administrator, but refused all interference. It was written of him that 'He was the most zealous man of his time, for the Church of England,' also 'that he was very rude, and most pedantic and pedagogical, yet still aimed at the public good.' His

stern discipline of the undergraduates led to one of them, Thomas Brown (*q.v.*), being threatened with expulsion unless he could trans. extempore epigram 33 of book 1. of Martial, to which he replied with the lines:

'I do not love thee, Dr. Fell,

The reason why I cannot tell:

But this I know, and know full well,

I do not love thee, Dr. Fell.'

He spent large sums of his own money on the building of Christ Church (*q.v.*). He wrote many learned and religious works, and is noted, too, for his services to printing and publishing.

Fellah, plural **Fellahin** (Arabic for ploughman), name applied to the peasantry of Egypt. They preserve to some extent the blood of the anct. Egyptians, but the mixture of race due to long ages of inter-marrying with the various peoples who have occupied the country shows in the wide differences to be seen in their colouring, ranging from a deep bronze to almost white. Physically the F. are a fine race: the men are powerfully built with well-shaped skulls, oval faces, and large, clearly-cut features; the women when young are often very graceful and beautiful. Most are Moslems in religion. Their huts are of mud, roofed with straw, and only a few of the wealthier of them have brick houses. As a class they are poor, but the growing prosperity of the country is lifting their condition, and the advantages of education, hitherto entirely denied them, may do much for them. They are a cheerful, good-natured, and most industrious people, and under discipline of Brit. officers become sound soldiers. See EGYPT.

Fellani, or **Fellata**, see FULANI

Fellenburg, Philip Emmanuel von (1771-1844), Swiss educationist: *b.* at Berne. After distinguishing himself at the univ. of Tubingen he studied the life of the peasants and workmen of Switzerland, and was influenced by Pestalozzi. In 1799 he bought the estate of Hofwyl, near Berne, and started an agric. college in conjunction with Pestalozzi, from whom he later separated. It was based on a new system of bringing all ranks of society close together by education; and in spite of the ridicule it first encountered, proved a success.

Fellhammer, vil. of Polish Silesia, near Schleswig, Gottesberg distr., 18 m. S.W. of Wroclaw. Pop. 6000.

Felling, tn. in Durham, England. It forms a suburb of Gateshead, and is in the Jarrow parl. div. Paper, glass, and chemicals are manuf. there. Pop. 26,000.

Fellowes, Edmund Horace (*b.* 1870), Eng. clergyman and musicologist, *b.* in London. Attached to St. George's Chapel, Windsor, since 1900. Hon. Mus.D. of Dublin (1917) and Oxford (1938). He has written works on Byrd, and Orlando Gibbons, and ed. the complete series of Eng. madrigal and late songs (68 vols.) and besides much Tudor Church music.

Fellow-feeling, see SYMPATHY.

Fellows, Sir Charles (1799-1860), Eng. archaeologist, *b.* at Nottingham. In 1820 he became a member of the Brit. Association. In 1838 he went on the first of

his four expeditions to Asia Minor. His second expedition resulted in the discovery of thirteen anct. cities in Lycia. The fourth expedition was the most famous and satisfactory: it resulted in twenty-seven cases of marbles, chiefly from Xanthus, being presented to the Brit. Museum. This pioneer of archaeologists penetrated to dists. unknown by Europeans, entirely at his own expense. He wrote sev. books on his travels. In 1845 he was knighted, receiving no other public acknowledgment of the work he had accomplished. Wm. James Muller (*d.* 1845), the Eng. painter, accompanied F. to Lycia, and made many beautiful and interesting sketches of the anct. works of art.

Fellowship (Oxford, Cambridge, and Trinity College, Dublin, Univs.) term applied to a member of the foundation of an incorporated college, sharing in the gov. and receiving an income from the college revenues. F.s. are conferred generally through open examination, on Bachelors of Arts, whose careers have been distinguished. There are prize F.s. involving no collegiate duties, and official F.s. which are attached to the teaching and tutorial staff. Honorary F.s. are conferred on distinguished persons. The Dublin Univ. fellows hold their office for life. At first fellows were restricted to persons who took holy orders and were celibates: this was abolished in 1858.

Fell Pony, see under HORSE.

Felltham, Owen, see FELTHAM.

Felo de se (literally a felon on himself, i.e. a murderer of himself), the legal term for a suicide, hence used in verdicts where juries do not find evidence of temporary insanity. See SUICIDE.

Felon and Felony, in Eng. law, a legal term for a special but ill-defined group of criminal offences. Whether a particular crime is a felony, a misdemeanour, or a summary offence, must be determined by reference to the common law and to various statutes. Roughly, felonies are the more serious forms of crime, such as were once capital crimes punishable by death, and involving attainder and forfeiture of estates. Treason has been classified as a special form, but is usually grouped as a felony. The prin. differences between a felony and a misdemeanour are that a private person may arrest a F. without warrant, that costs of prosecution are paid from public funds. One difference in the procedure for trying a F. is that the accused has the right to challenge, without stating a reason, any member of the jury (up to twenty). The tendency of modern legislation is to classify new crimes as misdemeanours; but beyond this, and the fact that in the early days of the development of our common law, a crime was usually a felony, no general rule can be laid down for differentiating between felonies and misdemeanours.

Felsite, term used by geologists for fine-grained igneous rocks of acid composition. They are composed chiefly of felspar and quartz in very minute particles. In colour, the rocks are usually of a reddish-yellow, and are hard and sometimes

nodular. They occasionally contain porphyritic crystals of clear quartz, and are then known as quartz-Fs. The variety of formation of these rocks has led to considerable discussion, and it cannot always be determined whether F. is an original substance, or the result of devitrification of primary glass. They are divided up into granite porphyries, orthophyres, felsitic rhyolites, etc. The term soda-Fs. is used of fine grained rocks containing large quantities of soda-felspar.

Felspar (from Ger. *Feldspath*), important group of mineral silicates, forming prin. components of various plutonic and volcanic rocks. For example, Lyell gives the minerals essential to granite (plutonic) in their order of importance as F., quartz, and mica, and the trachytic rocks (volcanic) are largely felspathic. The chief constituent of all Fs. (sometimes over 60 per cent) is silica; alumina sometimes reaches 30 per cent, and there are varying proportions of lime and soda. Fs. are classified according to their cleavage as monoclinic (including orthoclase, adularia, and sanidine) and triclinic (albite, anorthite, etc.). The sub-divs. are based on chemical composition and crystallography. Fs. decompose when exposed to weather, forming various soils, among others china-clay. Kaolin, from which fine porcelain is made, consists of decomposed orthoclase. The Fs. have a sp. gr. of from 2.55 to 2.75, and their hardness, 6 to 6.5, is less than that of quartz. Pure F. is colourless, but many varieties are finely tinted owing to the presence of various minerals. Among these are: Amazon stone, a green F. found in Russia and U.S.A., this is often cut and polished; moonstone, a translucent variety known as adularia (hence its sheen is called adularescence), found in Ceylon; Labradorite, generally dull, but sometimes playing with brilliant blue, purple, and other tints, then very handsome when polished; sunstone, called aventurine from its golden spangled lustre, like that of aventurine glass, found in Queensland, Russia, and U.S.A. The colouring of red and grey granites is due to the Fs. they contain.

Felstead, or **Felsted**, vil. in Essex, England, famous for its Public School, which dates back to its foundation as a grammar school by Richard, first baron Rich, 1561. It was a well-known Puritan school in the seventeenth century, and four sons of Oliver Cromwell were educated there. Since 1856 extensive new buildings have been erected and playing fields added, and the numbers have greatly increased. See A. Clark (ed.), *Foundation Deeds of Felsted School*, 1916. Pop. 2000.

Felsites, name given to volcanic rocks allied in composition to the granites. The name is also often used to describe anct. lavas allied to the Liparites or to Obsidians which have become devitrified. Certain Scottish rocks which were once classed as Fs. are really devitrified trachytes.

Felt, fabric produced by the 'felting' or 'matting' together of fibrous materials, such as wools, furs, and some hairs. The

hairs from wool are covered with serrations or minute hooks which can easily be forced together, so as to become 'matted.' Fibre Fs. are interesting as the art of felting preceded the art of weaving in the anct. civilisations of Asia. There are two classes of Fs., the woven F. and the fibre F. In the former, selected wools are used, such as Saxony wool, and woven into a cloth that will endure the subsequent shrinking or felting; to obtain the heavier Fs., two or three woven cloths are stitched together before they are subjected to the process of shrinking. The material is passed between hollow steam-beated rollers which are kept moist and warm, and the fabric, thus treated, tends to shrink and thicken and become dense enough to resist water. Fibre F. is divided into the F. used for hats, impregnated F., and the ordinary F. For the manuf. of F. hats, vegetable fibres, silk, hairs, furs, and wool are used; hair and wool being the most usual. The F. made for hats goes through the same process as other F.; for fur hat Fs., an air blast is used to carry fibres on to the required shape, and the F. is impregnated with stiffening agents. The prin. use for F. is for the linings of furniture, rubber shoes, undercarpets, slippers, steam engine packing, and covering steam hot-water pipes and all vessels which are to be insulated to prevent condensation, etc. The impregnated iron felt is a later development, used in the construction of bridges, etc., in the place of rubber. Asphalted F. is used for roofing, especially for wooden structures.

Feltham, vil. in the co. of Middlesex, England, situated about 4 m. E. of Staines. It possesses a number of nurseries and mrkt. gardens. Pop. 16,300.

Feltham, or **Felltham**, Owen C. 1602-1668), Eng. author⁷⁰, at Mutford, Suffolk. Noted for a vol. of essays entitled *Resolves, Divine, Moral and Political* (1623). His writing was modelled on that of Bacon, and has a certain charm. The later eds. of *Resolves* include a collection of poems entitled *Lusoria*.

Felton, John (1595-1628), member of an old Suffolk family estab. at Playford. He served as a lieutenant in the army, and the rejection of his repeated applications to the first duke of Buckingham, George Villiers, for promotion, on account of some personal enmity, bred a deep hatred. He went to Portsmouth and, mixing with the crowd of applicants who waited on the duke, stabbed Buckingham dead. Felton was hanged at Tyburn: on his way to the gallows the crowd blessed him publicly for delivering them from the hated duke.

Feltre, tn. and episcopal see of Venetia, Italy, in the prov. of Belluno. It possesses a fine cathedral with a sixteenth-century polygonal apse. The theatre, once the Palazzo del Consiglio, is attributed to Palladio. Pop. (tn.) 6500, (commune) 20,000.

Felucca, name of a particular kind of sailing boat used on the Mediterranean and in Egypt. It is a large boat built with a high bow and raking sternpost, and rigged with two or three masts, with lateen sails and a jib. It rides low on the water

and moves very swiftly, being the fastest sailing boat on the Mediterranean.

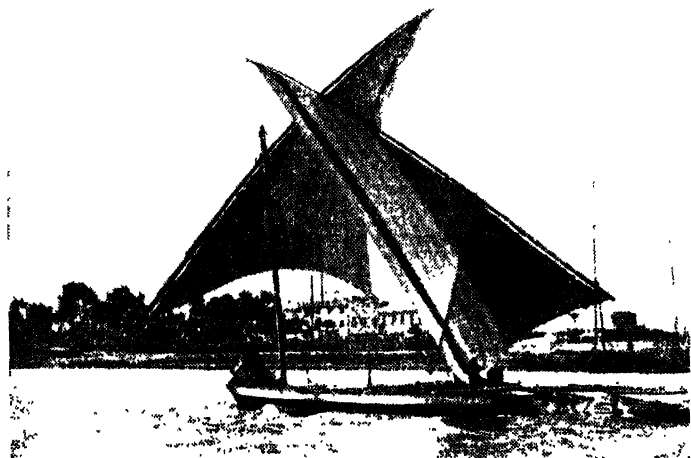
Female Suffrage, see **WOMEN'S SUFFRAGE**.

Feme, O.F. word, the modern being *femme*, used in English phraseology for 'woman'; *feme covert*, a married woman, i.e. protected by a husband, and *feme sole*, a widow or spinster.

Femern, see **Fehmarn**.

Feminism, belief in or advocacy of the influence of women in spheres conventionally reserved to men, or, more briefly, the movement for the equality of the sexes. The movement for extending the franchise

the growing plants; afterwards it must be cut and trimmed regularly or it will run to top, and gaps must be quickly stopped. Park F. are often constructed of posts and rails with feather-edge boards nailed on the latter, making a strong and neat enclosure. A sunken F., or 'ha-ha,' is one made along the bottom of a hollow which is invisible until one reaches its edge. In parts where stone is plentiful dry-walls are often constructed, in Aberdeenshire of granite boulders, in some Eng. cos. of pieces of limestone, the top and bottom layers being sometimes fastened with mortar. On moorlands earthen banks



A FELUCCA ON THE NILE

Canadian Pacific

to women in England had its intellectual genesis in the writings of John Stuart Mill. The great practical difficulty before emancipation lay in women's legal disabilities in the matter of acquiring their own separate property, a difficulty which was largely disposed of by the Married Women's Property Act, 1882. Legislation for giving the vote to women always passed the Commons from 1886 until 1911, being as regularly vetoed by the House of Lords. In 1918 a bill granting limited franchise was passed, and ten years later, full equality in this respect was attained. See also **WOMEN'S SUFFRAGE**.

Femur (thigh), see **LEG**.

Fences, are made for various purposes, such as enclosing animals on pasture-ground, protecting crops from straying cattle, affording shelter from wind, and marking off boundaries. The ordinary hedge and ditch of an Eng. farm makes excellent fencing, but is expensive in the matter of room, and where there are trees in the hedgerow they impoverish the ground. The hedge itself must be thickly set, and when new requires protection for

topped with gorse make excellent F. Where wood is scarce enclosures are often made of stout wire set up on straining-posts, with minor standards between.

Fenchoufu, city in Shansi prov., China, situated close to the r. b. of the R. Fen.

Fencibles, forces raised for local defence only, or on an emergency, e.g. the Eng. volunteers of 1804, at the time of Napoleon's threatened invasion.

Fencing, art of using a sword, foil or similar weapon, for attack and defence. In medieval times steel-clad knights fought with lances, axes, and heavy swords, but when armour was gradually abolished by the introduction of fire-arms personal encounters came to be fought most frequently on foot, and success in the *duello* depended mainly on good sword-play. Skilled instructors were required, and were found among the plebeian foot-soldiers, who had for generations 'trusted to their hands to keep their heads.' Schools of swordsmanship were estab. in Germany, Italy, and Spain, and at length, under Henry VIII., a Corporation of Masters of Defence was formed in England,

The teaching, however, was not by any means like that of to-day, as it included the wielding of the huge two-handed sword, sword and dagger, sword and buckler, and other weapons now obsolete. Rapier practice, the commencement of modern F., seems to have originated among the Its. who discovered that the use of a light swiftly-handled blade was not only prettier but also more deadly than the cut and slash of a heavier weapon. Light and swift must here be understood as comparative terms, for the early rapier was often four to five feet long and fairly weighty. For many years the new system was looked upon with disfavour in England: in Elizabeth's time we constantly find it referred to in opprobrious terms, both gentlemen and professionals speaking of it as a murderous and (of course) 'un-English' innovation. But the handiness and efficiency of the rapier gradually made it popular, as it could be worn on occasions and in places where a heavy sword and buckler would have been cumbersome and decidedly not ornamental. For the new school It. teachers were indispensable, and towards the end of the sixteenth century sev. estab. themselves in London, the most noted being Salvio and Rocco. The former left a treatise on *The Use of the Rapier and Dagger*, which may remind us of the duel described in *Romeo and Juliet*, Act III. scene 1, fought with these same weapons. Though excellent for cutting and thrusting, the rapier was still unsuitable for quick parrying, which was done with the dagger, so that in a duel or fencing-match both hands were employed. Sometimes instead of a dagger a second rapier was used, slightly shorter than the first; the pair were known as 'a case of rapiers.' Sev. well-defined movements of the body (such as the *incartata*, a spring to one side to avoid a thrust), prescribed by the It. school, gave rise to the frequent jeers about 'skipping' indulged in by Eng. fencers.

Tricks were then sedulously taught and practised which would now be condemned; in fact, in that age of chivalry our modern ideas of fair-play would have found little favour. Many a teacher professed to have the secret of some infallible stroke by which an opponent could be slain, blinded or crippled, and these strokes were often mercilessly put into practice. The famous, or infamous, 'coup de Jarnac,' by which Chabot de Jarnac hamstrung Vivonne de Châtelleraune in 1547, was an It. device taught him by Capt. Calzo, and was highly commended by Marozzo of Bologna, one of the most celebrated fencers of the time. Wearing concealed armour was so frequent that it became customary to search the combatants before a duel. One Millaud gained renown by defeating even this precaution when fighting the baron de Vitaut. He opened his shirt politely and showed his chest: the searcher was satisfied, but Millaud was wearing a very fine steel corset, painted to look exactly like flesh. He killed his opponent. These instances show the spirit in which combats were often carried on in those days, and

no doubt stories of this kind helped to intensify Eng. prejudice. Sword and buckler play went on flourishing in this country long after it had died out among the upper classes, lasting in fact down to the time of Queen Anne. It seems to have been specially popular in the W. cos. forming a prin. item at the 'Dover's meetings' at Wootton-under-Edge (Glos.) and other country revels. Its place was afterwards taken by single-stick bouts, like those described in *Tom Brown's School Days* and *The Scouring of the White Horse*. These contests were varied with boxing matches, and eventually led to the institution of the prize-ring.

The sword had a literature of its own in Italy and Germany even before the invention of printing, and by the end of the sixteenth century many works had been pub. on the subject, some of them dealing with the gentle art of quarrelling. Saviole, in his treatise, *Of Honour and Honourable Quarrels*, maintains that looking hard at a man in the street is a fair matter of challenge, and gives a case from Trieste, where this slight cause led to one man being killed, two others wounded, and a fourth beheaded. As to 'giving the lie,' Touchstone's discourse in *As You Like It* is elementary compared with the niceties of the duelling-book.

There were sev. distinct schools of fencing, the It., swift and crafty: the Sp., elaborate even to pedantry: and the Ger., which favoured not only the rapier but also heavier weapons. The two former were in turn popular in England and France until in the latter country, under Louis XIV., the invention of the court-sword, with its light three-sided blade adapted only for thrusting, did away with the rapier, and brought in small-sword F. The lead in this was naturally kept by France, and the Fr. style of play has been adopted everywhere except in Italy, which country has a traditional method of its own for this as for other F. The small-sword has a slight tapering blade, bayonet-shaped, and about 34 in. long, of which the half near the guard is the *forte*, the other half the *foible*. The foil used for practice has a steel blade, quadrangular in section and tipped with a round button, from which it takes its Fr. name, *fleuret* (It. *fioretto*). Foil play was greatly affected by the introduction of the fencing-mask, invented by La Boësière in 1780, and became quite different in style from actual fighting. With a sharp point every hit must tell, and sword practice was therefore cautious and comparatively deliberate, but with the foil and mask there grew up a convention that no hits were reckoned except those on the body, and even then only according to certain rules. This encouraged a much quicker style of play, and a turn with the foils is now one of the finest of athletic exercises, every muscle in the body and limbs being called into action. The It. school still keeps to the 'effaced' position, i.e. the fencer stands sideways with his right to the front so that the heart is not exposed, but the Fr. have abandoned this for a more natural atti-

tude, which gives greater freedom and does not tire the muscles so readily. Their grip on the handle is also much lighter than that of the *Its*. Many practical swordsmen have objected that conventional foil-play is entirely artificial; a hit for example in the fore-arm which 'does not count' might disable a man in actual fight. For this and other reasons foil-fencing has not been so popular in England as abroad. But a newer style has arisen in which the rules and conditions are such as to prepare for real combat. This is *épée-fencing*, in which an ordinary small-sword is used, tipped with a button, sometimes furnished with tiny points to mark a hit; every hit counts. This system was introduced into England in 1900; the London *Épée Club* was soon established, and has held many open tournaments. *F.* is one of the events of the Olympic Games.

Modern *sabre-fencing* is descended from the broadsword fighting of the Middle Ages, but with great modifications. The *It.* *sabre* of to-day is very light compared with ancient weapons, and is used for thrusting as well as cutting. One variety, the *sciabola*, is especially dangerous; besides the usual edge, it has also a 'false edge' on the back of the blade for about eight inches from the tip. In Germany the basket-handled *sabres* used in univ. duels were somewhat like the heavy swords carried by old Ger. *Reiters*, having flat curved blades about 32 in. long and 1 in. broad; they are not used for thrusting. Another favourite weapon with Ger. students was the rapier or *Schläger*, this also was used for cutting only. See also *DUEL* and *DUELLING*.

Bibliography.—L. C. Roux, *L'escrime dans les universités allemandes*, 1885; E. Castle, *Schools and Masters of Fence*, 1885, 1892; H. A. C. Dunn, *Fencing*, 1889, 1924, Capt. Hutton, *The Sword and the Centuries*, 1901; Lieut. Betts, *The Sword and how to use it*, 1908; J. J. Renaud, *Méthode d'escrime à l'épée*, 1909; Sir R. F. Burton, *The Sentiment of the Sword*, 1911.

Fénelon, François de Salignac de la Mothe (1651-1715), Fr. archbishop and writer, b. of good family at the Château de Fénelon in the prov. of Périgord. He came to Paris in 1666, and after a term at the Plessis College he entered the famous theological college of St. Sulpice, then recently founded. He took holy orders there in 1675, and in 1678 became director of the *Nouvelles Catholiques*, a Parisian institution for female converts from Protestantism. On the revocation of the Edict of Nantes in 1685, he accompanied a mission to the Protestants of Poitou and Saintonge. In 1689 Louis XIV. appointed him preceptor to his grandson, the duke of Burgundy, a position which he held for the next six years. The varied character of F.'s works is a proof of the originality and flexibility of his mind. They include theological and controversial works, of which the chief are the *Traité de l'existence de Dieu* (1712), and the *Maximes des Saints* (1697); educational and moral works: the *Traité de l'éducation des filles* (written in 1681, pub. 1689) for the daughters of the

Duchess of Beauvillier; and the *Fables*, the *Dialogue des morts* (1699)—the leading idea of which is that politics must be guided by moral principles—and the *Aventures de Télémaque* (1699), all composed for his royal pupil; political writings, of which the most important are *Plans de gouvernement*, and the *Direction pour le conscience d'un roi* (1711); critical works: the *Dialogues sur l'éloquence* (1718), and the *Lettre à l'Académie* (1716). The *Aventures de Télémaque* is a pedagogic romance, imparting moral teaching together with instruction in Grk. mythology and antiquities. The politics of the book are more or less Utopian and its satire was aimed at the king—whence his anger



FRANÇOIS FÉNELON

Engraving by J. Thomson from Vivien's picture in the Louvre

when it was pub. clandestinely. The *Plans de Gouvernement* was also directed at the king: in it F. advocates a limited monarchy in which the king may demand of his subjects only what is necessary for the good of the State, and in which authority would be shared with a strong and Christian nobility mediating between monarch and people. F.'s services to the duke of Burgundy, however, led to his advancement, and he was presented to the abbey of St. Valéry in 1691, and in 1695 became archbishop of Cambrai. About this time arose the controversy concerning the Quietism of Madame Guyon, who, accused of sharing the more extreme views of Molinos, was twice imprisoned. F. defended her so far as the attacks against her were personal, and this led to a long and acrimonious controversy with Bossuet, with whom he had previously been on the best of terms. Bossuet issued his *Instruction sur les États d'Oraison*, and F. took up the cudgels on behalf of Madame Guyon, and defended some of her teachings in his

Explication des Maximes des Saints sur la Vie Intérieure (1697). The latter was pub. first, in violation of an understanding between the two prelates, apparently without the knowledge of the author, and this led to their final estrangement. After some delay, during which the controversy grew more embittered, the Pope, pressed by Louis XIV., condemned the *Maximes des Saints* in 1699, and F. honourably accepted the decision in accordance with his own declared views on papal authority. Pope Innocent summed up the matter in the words, 'F. erred by loving God too much, and Bossuet by loving his neighbour too little.' Ordered by the king to retire to Cambrai, F. spent his last years in doing good pastoral work within the confines of his diocese. He was buried in Cambrai Cathedral. The only controversy of his later years had reference to the Jansenists, whom he opposed to the point of persecution. It is generally conceded that F. was in many ways a model archbishop, but for the rest his character has been the subject of much speculation and controversy. He was a born teacher, who combined the address of a *grand seigneur* with all the refinements of an accomplished ecclesiastic; gentle but also hard and inflexible when the case required it. He carried on a voluminous correspondence, and his many interests included politics, literature, and philosophy.

There are eds. of his works by J. B. Bossuet (1821-24), Lebel and Leclère (1820-30), Gosselin (1851) and *Correspondances* (1827). See J. B. Bossuet, *Histoire de Fénelon*, 1850; E. De Broglie, *Fénelon à Cambrai*, 1884; M. Masson, *Fénelon and Madame Guyon*, 1907; H. Bremond, *Apologie pour Fénelon*, 1910; A. Déplangué, *La Pensée de Fénelon*, 1930; E. Carcassonne, *État présent des travaux sur Fénelon*, 1939.

Feng Kuo Chang (d. 1920), President of the Chinese republic, July 1917-Oct. 1918; one of the generals of President Yuan Shikai, on whose retirement he became Vice-President under Li Yuan Hung. On deposition of Li and immediate collapse of Manchu restoration, he became President. Secession of S. provs. left him president of N. China only. Schemed to conciliate the S., while his ministers were of the pro-Jap. faction.

Feng Yühsiang, Chinese 'Christian general'; b. 1880, at Chaohsien, Nganhwei prov. Educated as a Baptist. He began his military career in Tibet, 1909. Brigade commander, 1913; military governor of Shensi and commander of eleventh div., 1921. Military governor, Honan, May 1922; commandant, Peking garrison, Oct. 1922. Chief of defence, N.W. frontier, 1923. Seized Peking, deposed President Tsao Kun Oct. 22, 1921. Joined Kuomintang, March 1925. Evacuated Peking, April 1926. Won back Shensi, Nov. 1926; Honan, May 1927. Member of the council of state, Nanking Gov. Oct. 1928. Expelled from Kuomintang May 23, 1929.

Fengtien, see LIAOTUNG.

Fenho, largest riv. in Shansi, China. It flows in a S.S.W. direction, and is a trib.

of the Yellow R. The lower course of the riv. is the only part navigable, and this only part of the year, as in winter it is frozen over.

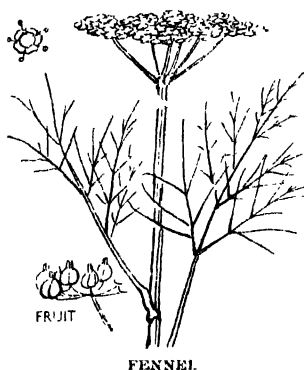
Fenians, or Fenian Society, name of a modern Irish-Amer. movement for the overthrow of Brit. rule in Ireland and the estab. of a republic. The name was derived from the anct. *fiann* or *féinne*, a legendary band of warriors in the heroic age of Ireland. The modern movement originated in America, where the Irish pop. had been largely increased by emigrants after the famine of 1846-47, and it was there that the first Fenian organisation was founded by John O'Mahony in 1858. The F. were particularly active in the W. states, but the movement soon had many ramifications, and agents were sent to Ireland and to the centres of Irish pop. in England. The result in Ireland was the 'Phoenix Conspiracy,' which was put down with little difficulty by the gov. James Stephens, one of the 'rebels of 1848,' and other prominent leaders were arrested, and *The Irish People*, ed. by Jeremiah O'Donovan (O'Donovan Rossa), a prominent member of the Phoenix National and Literary Society, was suppressed. Many prisoners were convicted of treason and sentenced to penal servitude. Stephens escaped from prison, and renewed the agitation in America. A raid into Canada occurred in 1866, but it proved a complete failure. The collapse of the movement dates from 1867, when an attempt at insurrection in Ireland proved utterly abortive. The Catholic priesthood never countenanced the movement, and the peasantry were lukewarm. Sev. outrages took place in England. A raid was made on the castle and military stores at Chester, but the raiders were betrayed. In the same year (1867) a police van, containing suspected F., was attacked at Manchester, and an attempt was made to blow up the wall of Clerkenwell Prison in London. The energetic measures of the gov. and the subsequent Irish reforms, inaugurated by Gladstone, restored tranquillity in Ireland. Fenianism, however, continued to smoulder, particularly in the United States, where another raid on Canada was frustrated by the U.S.A. Gov. The Clan-na-Gael, and United Irish Brotherhood were then the two great F. societies, and at the instigation of Michael Davitt they made the new departure which resulted in the Land League and the National League. The Phoenix Park assassination (1882) was connected with the extreme party. The ideas of the F. were partly adopted by Arthur Griffith who founded the radical nationalist party or Sinn Féin (q.v.) in 1902. See J. Rutherford, *Secret History of the Fenian Conspiracy*, 1877; Justin McCarthy, *History of our own Times*, 1880; J. O'Leary, *Recollections of Fenians and Fenianism*, 1896; and W. O'Connor Morris, *Ireland from 1798 to 1898*, 1898. See also HOME RULE; IRELAND.

Fenn, George Manville (1831-1909), Eng. novelist, the author of nearly 200 books of adventure for boys and girls. In some of his books he collaborated with

other writers, such as G. A. Henty. Among his best known books, and perhaps the most appreciated by boys, were: *In Freedom's Cause*, *Dick o' the Fens*, and *Quicksilver* (1896).

Fenneo, Moorish name for *Canis zerla*, also called *Vulpes zerda*, a species of fox native to N. Africa and ranging over the whole of the Sahara Desert. It has a coat of a pale fawn colour, which harmonises with its surroundings, black markings on the tip of the tail, and white round the eyes and on the forehead. The ears are huge compared with the size of the head, and give the animal a grotesque appearance. The body and head measure 15½ in. in length, and the tail 6½ in. The F. is a burrowing animal, and lines its habitation with feathers, hair, and other soft materials.

Fennel, name given to various species of Umbelliferae. *F. dulcis*, or sweet F., is cultivated in kitchen gardens and used



for culinary purposes, especially in fish sauces and with salmon. Sometimes it is boiled and eaten as a vegetable. The seeds contain oil; they are also infused, and fennel-water, which has carminative properties, is obtained. In a natural state the seeds are very bitter, but under cultivation they become sweet and aromatic and are used to flavour more disagreeable medicines. *F. vulgare*, the common F., occurs on the cliffs near the sea in Britain. Giant F., or *Ferula communis*, grows three or four ft. high, and the fibre of its stems is used as tinder.

Fennell, John Greville (1807-85), Eng. artist, naturalist, and angler. He was a member of the staff of the *Field* and the *Fishing Gazette*. In 1866 he wrote the *Curiosities of Angling Literature*, which he added to his *Fishing Gossip*. F. was a friend of Dickens and Gaskell.

Fenny Stratford, mkt. tn. in Buckinghamshire, England, situated in a valley on the l. b. of the R. Ouzel. There is a church of St. Martin, built in 1730, on the site of an older one, and it is the custom

to celebrate St. Martin's Day, Nov. 11, by a service in the church and the firing of small canon called the 'Fenny Poppers.' Pop. 4000.

Fens, low-lying dist. in the E. of England, situated W. and S. of the Wash, in Lincolnshire, Huntingdon. Cambridge, and Norfolk. The dist. covers about 70 m. in length, and roughly 35 m. in breadth. It represents a bay of the N. Sea now silted up, of which the Wash is the last remnant. It is intersected with many water-courses, and the rivs. Witham, Welland, Nene, and Great Ouse. Before the present system of drainage was developed, the whole dist. was water-logged and consisted of marshy swamps, wide pools, and lagoons. The Romans made the first attempt to drain the F.; they dug the Caer or Car Dykes from Lincoln to Ramsey and constructed earthen embankments along the Welland and the seashore, some miles of which can still be seen. An unsuccessful attempt was made in the reign of Wm. the Conqueror to drain Deeping Fm. After this the dist. was abandoned, although the forest portions were preserved for the hunting of the Plantagenet kings, and the isolated spots rising above the surrounding levels were occupied by many monasteries as early as the seventh century, such as Peterborough, Ely, Crowland, Ramsey, and Thorney, from which spread cultivation and a certain amount of drainage in their immediate neighbourhood till the dissolution of the monasteries. In the reign of Charles I. another attempt was made to drain Deeping and Holland F. on Dutch methods by Cornelius Vermuyden, and the initial efforts were made on the great scheme of the Nene and Ouse F., known as the Bedford Level (q.v.). The drainage of the other F. continued through the eighteenth and nineteenth centuries. Frequent flooding has been caused in the F. by the coincidence of high spring tides and rivs. swollen with water drained off the land. The system of sluices (closed at high tide) keeps the sea water from entering the rivs. but likewise prevents the riv. water from escaping to the sea. The consequent piling up of fresh water strains the banks and flooding follows.

A scheme proposed in 1948 by the Great Ouse Catchment Board to remedy the matter envisages the construction of a new riv. from Kentford in Suffolk through Mildenhall and Lakenheath to Denver. From Denver a relief channel would carry the water direct to an outfall at King's Lynn.

The only part of the original wild, undrained Fenland is Wicken F., S.E. of Ely, now vested in the National Trust and preserved as a unique natural 'monument,' of wild plant and animal life. The soil of the F. is extraordinarily fertile and indeed forms some of the most productive agric. land in England, while there are splendid pastures for cattle. The inhabs. have always been noted for their love of liberty. Boadicea ruled part of the dist. Hereward the Wake was a fenman, and Cromwell came from the dist., and this spirit showed itself in the steady, though

unreasonable opposition displayed to the various drainage schemes, the draining of enclosures always bringing trouble with the people who regarded the land as their own, and were tenacious of their rights. In the more isolated portions of the F. they remained primitive in their habits. Their life was spent in fishing and fowling, both wild fowl and fish swarming in the rive, and marshes. In severe winter good skating can be had in the F., and many famous speed skaters have come from the dist. It is interesting to know that the old Brit. dye-plant, woad, is still grown in a few of the F. pars.; another but vanishing feature are the little wind-mills that are dotted about the lonely flats, now no longer used. See N. and A. Goodman, *Handbook of Fen Skating*, 1882; C. Marlowe, *The Fen Country*, 1925, and *Legends of the Fenland People*, 1926; W. H. Wheeler, *A History of the Fens of South Lincolnshire*, 1928; Iris Wedgwood, *Fenland Rivers*, 1936. For local colour, C. Kingsley's *Hereward the Wake*, 1866, and G. Manville Fenn, *Dirk o' the Fens*, 1887. For the Norfolk fenland, see G. C. Davies, *Norfolk Broads and Rivers*, 1884; P. H. Emerson, *Pictures of East Anglian Life*, 1888, and *Marsh Leaves from the Norfolk Broadland*, 1898; and C. Marlowe, *People and Places in Marshland*, 1927.

Fenton, or **Great Fenton**, tn. of Staffordshire, England. It is close to Stoke-upon-Trent, and is part of the same par. and municipal bor., and also one of the big pottery centres, most of the people being employed in the manuf. of earthenware and china. It comprises Fenton Culvert and Fenton Vivian, or Little Fenton. Pop. 26,714.

Fenton, **Elijah** (1683-1730), Eng. poet, b. at Shelton, near Newcastle-under-Lyme, Staffordshire. He became private secretary to the earl of Orrery, with whom he went to Flanders, but later he came back to England and was appointed headmaster of the free grammar school at Severnocks. He resigned in 1710, and became tutor to Lord Broghill, the son of his former employer. He worked with Pope at the trans. of the *Odyssey*, the 1-6, 4th, 19th and 20th books being trans. by him. He also ed. Milton and Waller (1725 and 1729) and wrote a tragedy entitled *Mariamne* (1723) and many poems. See W. W. Lloyd, *Elijah Fenton, his Poetry and Friends*, 1894.

Fenton, **Sir Geoffrey** (c. 1539-1608), Eng. writer and politician, son of Henry F. of Nottingham, and brother of Edward F. the navigator. He seems to have travelled a good deal in his early days and wrote *Certain Tropical Discourses written out of Frenche and Latin* (mainly stories from Bandello) while in Paris (1567). He also wrote *Monophylo* (1572), but his most monumental work, pub. in 1579 and dedicated to Queen Elizabeth, was *The History of the Wars of Italy*, trans. from the Fr. of Francesco Guicciardini. In 1580 he was made secretary to the lord deputy of Ireland, and succeeded in so ingratiating himself with the queen that he kept the post until his death.

Fenwick, **Ethel Gordon**, Brit. nurse (1857-1947), daughter of David Davidson Manson, of Spyrie House, Morayshire. Educated privately at Middlethorp Hall, York. She became a nurse in the Children's Hospital, Nottingham, in 1878, and was matron of St. Bartholomew's, 1881-1887. She married Dr. Bedford Fenwick, gynecologist, in 1887. From 1893, hon. editor of *Journal of Nursing*. Founder and first member of Brit. Nurses' Assoc. Largely through her efforts, nursing was made a registered profession in 1919. Founder and hon. president of the International Council of Nurses, 1900.

Fenwick, **Sir John** (1645-97), Brit. soldier. He entered the army and became a major-general in 1688. He was a strong partisan of King James II., conspired against Wm. III., and in 1691 publicly insulted Queen Mary. He was arrested in 1696 for a plot to assassinate the king, and was beheaded.

Fedor I. (Theodore) (b. 1557), Tsar of Russia (1584-98), son of Ivan the Terrible; he was of weak intellect and practically governed by his wife, Irene, and his brother-in-law, Boris Godunov. On his death he left the throne to Irene, who retired to a convent in favour of her brother Boris.

Fedor II. (Theodore) (b. 1589), Tsar of Russia (1605), son of Boris Godunov; a prince of remarkable intelligence. The first map of Russia by a native of the country was drawn by him. The boy prince was foully murdered by the usurper Demetrius I.

Fedor III. (Theodore) (b. 1656), Tsar of Russia (1676-82), eldest son of Tsar Alexius; an intellectual and noble prince, a man of advanced ideas, his life's work was to reform his country. Suffered from an incurable disease which half paralysed him. His consort, Akathia, is said to have been the first to advocate in Russia shaving of the beard.

Feodosia, chief port of the Crimea, standing at the E. tip of the mt. range which lines the coast as far W as Sevastopol. It exports wheat to European Russia and has tobacco factories. In peace time a health resort. F. was sev. times a battlefield in the Second World War.

Feoffment, in feudal times, was the usual mode of conveying a freehold estate in England, and for a long period it was the only mode. This method of conveying required to be accompanied by *livery of seisin*, either *in deed*, or *in law*. In the case of *livery in deed* the feoffer handed a twig or clod of turf to the feoffee on the land to be conveyed; in *livery in law* the feoffer formally gave possession to the feoffee in sight of the land. A F. was usually evidenced by charter or deed, but writing was not necessary before the Statute of Frauds. The Real Property Act of 1845 rendered F. superfluous.

Feræ Nature, term given in Rom. law to wild animals and birds, including game, such as rabbits and pheasants. In Eng., as was the case in Rom. law, they become the property of the first person who takes possession of them, subject of course, to

the game laws. A person keeping wild animals is responsible for any damage they may do.

Ferdausi, or **Ferdusi**, see **FIRDAUSI**.

Ferdinand I. of **Castile** (c. 1000-65), was the second son of Sancho the Great of **Navarre**. He acquired possession of **Castile** in 1028, and was recognised first king of **Castile** in 1033. In 1037 he claimed **Leon** by right of his wife, who was a sister of **Bernudo III.** of **Leon**, and enforced his claim with the sword. He drove back the **Moors**, extended his frontiers from the **Duero** to the **Mondego**, and took the title of Emperor of **Spain** in 1056. He left a reputation for piety.

Ferdinand I. of **Aragon** (c. 1373-1416), surnamed 'The Just,' was the son of **John I.** of **Castile**, but was elected king of **Aragon** in 1412. He proved a strong ruler, and carried on the war against the **Moors**. Though at first a supporter of the anti-pope, **Benedict XIII.**, an **Aragonese**, he afterwards agreed to his deposition in order to end the **Great Schism**.

Ferdinand V. of **Aragon** (1452-1516), son of **John II.**, b. at **Sos** in **Aragon**. At sixteen he married (1469) **Isabella** of **Castile**, and on the death of her brother, **Henry IV.**, in 1474, F. and **Isabella** were proclaimed joint sovereigns, though **Isabella** did not allow her husband much share in the gov. F. succeeded to **Aragon** in 1479 on the death of his father, and the union of these two kingdoms marked the beginnings of Sp. ascendancy in Europe. F., who, on his accession, found faction and disorder rife, reorganised the **Santa Hermandad**, or military police, and suppressed the banditti. The menacing power of the nobles was broken down, and vigorous reforms were carried out, the king and queen being ably seconded in all their undertakings by the celebrated **Cardinal Ximenes**. In the memorable year of 1492, **Granada**, the last kingdom of the **Moors** in **Spain**, was finally conquered after ten years of strenuous conflict. In that year also **Columbus**, supported by the queen, set out on his great voyage of discovery, which made F. and **Isabella** sovereigns of a new world. A less creditable episode of that period was the spoliation and expulsion of the **Jews** in 1492-93. The **Moors**, too, were treacherously treated, a promise of toleration by the 'Catholic kings' being violated. The **Court of Inquisition** had already been instituted at **Seville** (1480). In 1500 F. took part in the conquest of **Naples**, and, outwitting his allies, made himself master of it in 1503. By arranging politic marriages for his children, he gained for himself allies on all sides of France, and in 1512 he seized a favourable opportunity to add the S. part of the coveted kingdom of **Navarre** to his dominions, which thus stretched from the **Pyrenees** to **Gibraltar**. **Isabella** had died in 1504, and F. married **Germaine de Foix**. He died at **Madrigalejo**, and was succeeded by his grandson, the Emperor **Charles V.**, who was already master of **Burgundy**, **Flanders**, **Holland**, and part of **Italy**. F. and **Isabella** were able rulers, but the brilliance of their reign

was marred by acts of gross cruelty and bigotry. F. was a shrewd and clever diplomatist, but was deceitful and despotic. For his expulsion of the **Moors**, the pope conferred on him the title of 'The Catholic.' See **W. H. Prescott**, *History of the Reign of Ferdinand and Isabella*, 1827-38; **W. T. Walsh**, *Isabella the Catholic*, 1936.

Ferdinand I., (Ger. emperor (1503-64), b. at **Alcalá**, in **Spain**, son of **Philip I.** and brother of **Charles V.** He married a sister of **Louis**, the king of **Bohemia** and **Hungary**, and he claimed the two kingdoms on the death of **Louis**, in battle, in 1526. His claim to **Hungary** was contested by **John Zapolya**, supported by the **Turks**, but, after buying off the **Turks**, F. gained the day. When he succeeded **Charles V.** as emperor in 1556, **Pope Paul IV.** refused to acknowledge him, and thenceforward the electors resolved not to ask the consent of the pope. F. tried to conciliate **Rom. Catholics** and **Protestants**, and his reign was marked by wise and enlightened gov.

Ferdinand II., (Ger. emperor (1578-1637), b. at **Graz**. His early training and his education by the **Jesuits** imbued him with a deep hatred against **Protestantism**, and he began early to try to put down **Protestantism** by force, first in his own duchy of **Syria**, and then in **Bohemia** and **Hungary**. When the **Bohemians** saw that F. intended to deprive them of the privileges they had gained under **Rudolf**, they declared that he had forfeited the throne and elected **Frederick Count Palatine** in his stead. This led to the outbreak of the **Thirty Years' war**, which had already begun when F. succeeded **Matthias** as emperor in 1619. F., supported by the **Catholic League**, was at first successful and gained a firm hold of the **Bohemian throne**. His general, **Tilly**, defeated **Christian IV.** of **Denmark** and the **Protestant confederacy** in 1626, but two years later, after **Wallenstein** was checked before **Stralsund**, the **Catholic cause** began to decline. The successes of the **Protestant champion**, **Gustavus Adolphus**, and the assassination of **Wallenstein**, at which F. connived, combined with other causes to bring his fortunes to a very low ebb at the time of his death in 1637. See **F. Hurter**, *Geschichte Kaiser Ferdinands II.*, 1850-1864; **A. Huber** and **O. Redlich**, *Geschichte Österreichs*, vols. v. and vi., 1921.

Ferdinand III., (Ger. emperor (1608-57), b. at **Graz**, the son of **Ferdinand II.** He took part in the **Thirty Years' war** before his accession in 1637, and, though more inclined towards peace than his father, was compelled to continue the war for the first eleven years of his reign. A series of disasters in the summer of 1648 forced him to make peace, and the peace of **Westphalia** was concluded in Oct. of that year. In the Diet of 1653-54, the last over which an emperor presided in person, important changes were made in the administration of justice. See **F. Gallati**, *Die Eidgenossenschaft und der Kaiserhof zur Zeit Ferdinands II und III.*, 1932.

Ferdinand I. (1751-1825), king of the Two Sicilies, was the son of Charles III. of Spain. He succeeded his father on the Neapolitan throne in 1759, ruling over Naples, 1759-1806 and 1815-25, and over Sicily, 1759-1825. He consolidated his dominions as the Two Sicilies in 1816. From 1806 to 1815 Naples was under the domination of Napoleon. F. was a weak ruler, and the gov. was largely controlled by his wife, Marie Caroline of Austria.

Ferdinand II., king of the Two Sicilies (1810-59), grandson of the preceding, was *b.* at Palermo. His reign opened in 1830 with fair promises, but they were unfulfilled, and his despotic rule culminated in insurrection in Sicily (1848). His ferocious bombardment of the chief cities in 1849, which brought the rising to an end, earned for him the nickname of 'Bomba.' His treatment of political suspects was the subject of two notable letters of Gladstone in 1850.

Ferdinand I. (1861-1948) first tsar of Bulgaria, *b.* in Vienna, the youngest son of Prince Augustus of Saxe-Coburg and Princess Clementine of Bourbon-Orléans. He married: (1) 1893, Princess Marie Louise, daughter of the duke of Parma, who died in 1899; and (2) 1908, Princess Eleonore of Reuss, who died in 1916. On the deposition of Prince Alexander of Bulgaria, F. accepted the offer of the succession. He was elected by the Bulgarian parliament on July 7, 1887, but his sovereignty was not recognised by the Porte until 1896. A nimble cunning distinguished his reign, and with much astuteness, he played the politicians and the military against each other. He invested the liberal and patriot Stambulov with almost dictatorial powers and used him to secure the Sultan's recognition; and once this had been obtained, he dismissed Stambulov and used Dr. Stoilov to make terms with Russia. By 1896 his position, both nationally and internationally, had been rendered secure. In 1908 he declared the complete independence of Bulgaria and assumed the title of tsar. This was recognized by the Porte and Powers in 1909. Though at first thwarted at every turn by Russia, F. set himself very successfully to the task of building up and consolidating his kingdom, and the results were seen on the outbreak of the Balkan war in 1912; the result of which was to enlarge the ter. of Bulgaria enormously. But his former allies, Greece and Serbia, dissatisfied with this result, turned against him, and, with the assistance of Rumania, in a war that began at the end of June 1913 (in which Turkey took a hand on its own account), greatly reduced Bulgaria's share of the conquests at their final settlement by the treaty of Bucharest on Aug. 10. This left F. bitter and revengeful against the other Balkan states. He remained neutral in the First World War until Oct. 14, 1915, when he entered it on the side of the Central Powers. He was victorious in Macedonia, Thrace, and Rumania; but his army was defeated by Allied troops at Dobropole, Sept. 1918, and an armistice was signed. On Oct. 4 he abdicated in favour of his son Boris,

and retired to Coburg, where he died thirty years later. See *Bonus III.*

Ferdinand II. of Leon (1136-88), younger son of Alfonso of Castile and Leon, succeeded in 1157. He was constantly at war with the Moors, Castile, and Portugal. His repudiation of his wife led to war with his father-in-law, Alfonso I. of Portugal, whom he defeated and captured at Badajoz. The military order of Alcantara was founded by the pope during his reign.

Ferdinand III. (c. 1200-52), 'The Saint,' son of Alfonso IX. of Leon and Berengaria of Castile; became king of Castile on the death of his wife's brother, Henry I., in 1217, and succeeded his father as king of Leon in 1230. Thenceforward the kingdoms were never separated. F. fought with success against the Moors, capturing Ubeda (1234), Cordova (1236), Jaen (1246), and Seville (1248). He subdued Granada and made Seville his cap. He was responsible for the collection and codification of the Lat. and Gothic laws known as the *Forum Judicum*. He was canonised in 1671 by Clement X., and is commemorated on May 30.

Ferdinand III. (1769-1824), grand duke of Tuscany (1790-99 and 1814-24), younger son of the Emperor Leopold II., *b.* and *d.* at Florence. He succeeded his father as grand duke, and continued his father's reforming policy. He was the first sovereign to acknowledge the Fr. republic, but nevertheless became involved in a quarrel with France, and Florence was occupied by the Fr. in March 1799. He was restored later in the year, but in 1801, by the treaty of Lunéville, Tuscany was formed into the kingdom of Etruria. F. was finally restored in 1814 by the Congress of Vienna. In the meantime he had been successively elector of Salzburg and grand duke of Wurzburg.

Ferdinand VI. of Spain (1713-59), *b.* at Madrid, the second son of Philip V. whom he succeeded in 1746. He helped to terminate the war of the Austrian Succession, and pursued a steady policy of neutrality in the Seven Years' war, in spite of overtures from England and France. He did much to revive literature and the arts in Spain. He was of weak constitution and retiring disposition, and on the death in 1758 of his wife, Barbara, who was greatly attached to him, he fell into deep melancholy, from which he never recovered.

Ferdinand VII. of Spain (1784-1833), eldest son of Charles IV, succeeded in 1790. Discontent with the gov. and the Godoy led to a rising in 1808, which forced Charles to abdicate and placed F. on the throne. F. was almost immediately led by Napoleon to abdicate in turn, and was enticed across the frontier and kept prisoner at Valençay. After the Peninsular war he was reinstated (1814), and promised to maintain the democratic constitution adopted by the gov. of National Defence at Cadiz in 1812. He twice broke a promise of this character, but receiving Fr. support was able to maintain despotic gov. He was succeeded by his daughter, Isabel II., for whose sake he had repealed the Salic law.

Ferdinand of Rumania (1865-1927); b. at Sigmaringen; second son of Prince Leopold of Hohenzollern-Sigmaringen; who was brother to Charles, first king of Rumania. Charles had no son. As F.'s elder brother was to succeed his father in Germany, F. was adopted heir to Charles in March 1889. On Jan. 10, 1893 he married Marie, eldest daughter of the duke of Edinburgh. In 1897 he nearly died of typhoid fever. Troops of the Central Powers overran Rumania on the outbreak of war in 1914; F. and his family retired to Jassy. He succeeded to the throne on Oct. 11, 1914, and immediately sided with the Liberal gov. against the Central Powers. He was obliged to sign an armistice, Dec. 7, 1917; but refused to sign the treaty of Bucharest, May 7, 1918, and denied its validity. In Nov. F. proclaimed expulsion of enemy troops; he re-entered Bucharest, Dec. 1. In Aug. 1919 he sent into Hungary an expedition which led to the downfall of Bela Kun. F. and Marie were crowned king and queen of Greater Rumania, Oct. 15, 1922, at Alba Iulia. Much of his estate was given up to peasants. In 1925 he caused his son Carol (q.v.) to be disinherited in favour of Carol's son Michael; and his last political act was to treat Carol's opponents in power. F. died of a malignant growth, at Sinaia, July 20.

Ferentino, tn. and episcopal see, Italy, 55 m. S.E. of Rome by rail, has remains of aet. limestone walls in the cyclopean style. It is a mkt. for oil and wine. The Church of St. Francis was severely damaged by bombing in 1943, but the twelfth-century mosaic pavement, pulpit, and choir-screen were spared. The church of S. Valentino also sustained damage. Pop. 12,300.

Fergana, or **Ferghanah**, region of Russian Central Asia. All the E. part of F. was added to the autonomous Kirghiz Soviet Republic (alternatively called Kazakhstan) in 1920. W. F. is now included in the Uzbek Socialist Republic (or Uzbekistan), formerly the khanate of Khokand. Nearly the whole of F. belongs to the fertile basin of the Syr Daria, the outlying parts being mountainous. To the E. are the Tien-Shan ranges; to the N. are the Ala-tau Mts., while the Trans-Ala-tau chain encloses the plain on the S. with the Tien-Shan. The richest and most densely populated part of this whole region of Middle Asia is the F. Valley. Sheltered from cold winds by some of the highest mts. in the world, which practically encircle it, it consists of a flat valley floor covered by a thick network of irrigation channels, with poplars and willows growing along their banks. Cotton and sugar beet are the chief crops. The lower hillsides of the valley are treeless, with occasional patches of pistachio, almond tree, iron wood and maple. The new F. canal is 170 m. long and provides water for over 12,000 ac. of grain as well as potatoes, cucumbers and tomatoes in the Uzbek, Tadzhik and Kirghiz Republics. Minerals, such as iron, coal, etc., are plentiful, and rice, maize, grapes, and melons are produced. The pop. is mixed,

the Tajiks, with the nomad Uzbeks and Kara-Kirghiz being the prin. races. In addition to Russian colonists, there are also Kirchaks, Sarts, Persians, Afghans, Hindus, Jews, etc. The chief tns. are Khokand, the cap., and Marghilan, the former cap. The tn. of F. is a centre of the cotton industry and has important cotton mills. Area, 35,446 sq. m.; pop. about 2,000,000.

Fergus Falls, co. tn. of Otter Tail co., Minnesota, U.S.A., on the Red River; has woollen factories and flour mills. Pop. (largely of Scandinavian origin), 10,800.

Ferguson, Adam (1723-1816), Scottish philosopher, b. at Logierait, Porthshire, was for a time chaplain to the Black Watch, and is said to have fought at Fontenoy. He succeeded Hume as keeper of the Advocates' Library, Edinburgh, in 1757; became prof. of natural philosophy in 1759, and of moral philosophy in 1764, at Edinburgh Univ., and afterwards travelled extensively. It was at his house that Scott, when a boy, had his memorable meeting with Burns. Chief works: *Essay on Civil Society* (1766), *Institutes of Moral Philosophy* (1772), and *History of the Progress and Termination of the Roman Republic* (1782).

Ferguson, Robert (c. 1637-1714), 'The Plotter,' a Scotsman by birth, spent most of his life in political intrigues. At first a Presbyterian minister, he became vicar of Godmersham, Kent, but was ousted in 1662 by the Act of Uniformity. He took a leading part in the conspiracies against the last two Stuart kings, accompanied Monmouth's futile invasion, and supported the cause of Wm. of Orange. Chagrined at the scant recognition he received under Wm., he finally transferred his services to the Jacobites. He was a busy pamphleteer, and pub. a *History of the Revolution* (1706).

Ferguson, Sir Samuel (1810-86), Irish poet and antiquary, b. in Belfast, was educated at Trinity College, Dublin, and was called to the Bar in 1838. He gave up his legal practice in 1867, when he was appointed deputy-keeper of the Irish Records. He was conspicuously successful in that capacity, and was knighted for his services in 1878. His antiquarian works include the *Ogham Inscriptions in Ireland*, pub. in the year after his death, and various papers contained in the *Transactions of the Royal Irish Academy* (1831-84), of which he was a notable president. Much of his leisure was devoted to poetry, and the charm of his lyrics and ballads anticipates the modern Celtic Revival. *The Forging of the Anchor* is generally regarded as his masterpiece. His other pubs. in verse include *Lays of the Western Gael*, (1865), and *Congal*, an epic poem (1872).

Fergusson, James (1808-86), 'the historian of architecture,' b. at Ayr. His studies in Bengal resulted in the pub. of *Rock Temples of India* (1843), *Ancient Buddhist Architecture of India* (1848), and *Fire and Serpent Worship* (1869). Also studied the archeological remains of Palestine and surrounding countries. His

monumental work is *A History of Architecture in all Countries from the Earliest Times to the Present Day* (1865-76).

Fergusson, Robert (1750-74), Scottish poet, b. at Edinburgh, his father being a clerk in the British Linen Company. He obtained a good education at Dundee Grammar School and St. Andrews Univ., but, declining to enter the church or to study medicine, he spent his few brief years as a copying-clerk in the commissary clerk's office, Edinburgh. He contributed humorous descriptive poems to *Ruddiman's Weekly Magazine*, and the reputation of these drew him into a convivial society in which he ruined his health. A meeting with John Brown of Haddington turned him to serious thoughts, but an injury to his head turned religious melancholy into insanity, and he died in the city asylum. Robert Burns was greatly influenced by his poems, which were first pub. in 1773.

Fergusson, Sir William (1808-77), eminent Scottish surgeon, b. at Prestonpans, the inventor of many surgical instruments, and prof. of surgery at King's College, London, 1840-70. He was elected president of the Royal College of Surgeons in 1870. *A System of Practical Surgery* (1842), was his most important work. He was elected a fellow of the Royal Society in 1843. See H. Smith, *Biographical Sketch*, 1894.

Feriae, name given to the holy days, or sacred festivals, of the anc. Romans. They were the *dies nefasti*, in contradistinction to the *dies fasti*. They correspond in some respects to the modern Sunday; political and legal business was suspended, and slaves were given a respite from labour. There were forty-five fixed festivals during the year, in addition to such festivals as the *feriae Latinae*, the dates of which were fixed annually, and special festivals at times of danger or victory. In addition to the *feriae publicae*, or public festivals, there were *feriae privatae*, observed by many single families in celebration of some particular event in the family hist.

Feridoun, see **FARDUX**.

Feringhi, or **Feringhee**, name for Europeans, common in the E., and dating from the Crusades, the word being a corruption of Frank. In India it is specially applied to the native-born Portuguese of Bengal. It has come to have a contemptuous implication, and was so used in the Indian Mutiny.

Ferishta, Mohammed Kasim (c. 1550-1612), Persian historian, b. at Astrabad. While still young he went to India and became captain in the bodyguard of the Prince of Ahmednagar. In 1589 he removed to Bijapur, and was commissioned by Ibrahim Adil Shah (1585-1628) to write a hist. of the Muslim dynasties of India. He is one of the most trustworthy of Oriental historians, and his work still maintains a high place as an authority. It has been trans. by Gen. J. Briggs under the title of *The History of the Rise of the Mohammedan Power in India* (1829).

Ferlach, tn. of Austria in Carinthia, close to the border of Yugoslavia. Noted for its industry of shot-gun making, which

originated in 1553, when Belgian craftsmen settled there. The leading *büchsenmeisters* still bear the names of their Belgian forebears. Lock, stock, barrel, engraving and other details have each their special craftsmen and the mechanism of various kinds is completed mostly in the craftsmen's homes. This unique industry is organised in a kind of guild, which is as jealous of its privileges as were the guilds of the middle ages. Recently a school was instituted to teach the craft in F., prior to which apprentices were only trained in the homes of the craftsmen. The Nazis removed the plans and tried to estab. a factory at Suhl, in Germany, but did not succeed in capturing the industry.

Fermanagh, co. of N. Ireland in the prov. of Ulster, with an area of 715 sq. m. The surface is hilly, the highest points being Cullacagh, and Belmore, but the chief feature of the co. is Lough Erne, which, with the R. Erne joining its lower and upper parts, bisects the co. throughout its entire length. The salmon fisheries of the Erne are important, and pike and trout are also caught in most of the loughs. There is an abundance of sandstone and limestone, and iron also occurs. Manufs. are few, the chief being pottery and coarse linen, for the people are chiefly engaged in agric. The only tn. of importance is Enniskillen. F. is in the two dioceses of Clogher and Kilmore. By the Gov. of Ireland Act, 1920, F. was united with Tyrone as a constituency for the return to the N. Ireland Parliament of 2 members. For administrative purposes F. is divided into the urb. dist. of Enniskillen and the rural dists. of Enniskillen, Irvinestown and Lisnaskea; Belleek and Clones were merged in the foregoing rural dists. in 1921. Pop. 55,000 (a decline of nearly 50 per cent through emigration).

Fermat, Pierre de (1601-65), Fr. mathematician, b. at Beaumont-de-Lomagne, near Montauban. He made many discoveries in the properties of numbers, probabilities, and geometry, and is said to have been the first to hit upon the principle of the differential calculus. He also collaborated with his friend Pascal in some of his mathematical researches. His writings include: *Arithmetique of Diophantus*; *Method for the Quadrature of Parabolas*; treatises, *Maxima and Minima*, on *Tangents*, and on *Centres of Gravity*; *Geometric Loci*, or *Spherical Tangencies*, and *Rectification of Curves*. His collected works were pub. at Toulouse in 2 vols., 1670-79, and were re-ed. by Tannery and Henry, 1891-94. F. was also an accomplished general scholar and linguist, and was for a time councillor for the parliament of Toulouse. See A. Gentz, *L'Influence de Fermat sur son siècle*, 1784, and P. Bachmann, *Das Fermatsche Problem in seiner bisherigen Entwicklung*, 1919.

Fermentation, process by which a change is effected in the chemical constitution of many organic substances. It is well known that liquids formed from the juice of fruits gradually alter in character with the evolution of bubbles of gas, that milk cannot be preserved from becoming sour without special treatment,

and that all dead organic matter putrefies or changes its chemical composition in course of time. These changes are brought about by the activity of various minute organisms, which contain substances known as enzymes. The enzymes are the actual agents of the fermentation processes. In many cases they can be extracted from the organisms and work just as effectively, showing that the presence of a living cell or cells is not essential to fermentation. Enzymes induce chemical changes in somewhat the same manner as catalysts hasten certain inorganic reactions. F. normally occurring in the presence of living organisms takes place when the temp. is suitable for their multiplication, where there is abundance of moisture and suitable food, and where there are no substances with a poisonous action on the organism. Perhaps the most important of fermentative processes is that by which the alcoholic liquors of commerce are prepared. This process is due to a member of the fungus group, yeast, which consists of rounded cells about .01 mm. in diameter, usually grouped in chain-like clusters. When introduced into solutions of sugars containing other organic substances which the yeast uses as food, the cells bud and multiply. The temp. must be maintained between 5° and 30° otherwise the cells are unable to multiply, and may eventually be killed. The yeast cells contain enzymes which produce characteristic chemical changes, and the action of each enzyme appears to be restricted to a few media. The chief enzymes present in yeast are *zymase*, which causes the breaking-up of glucose (grape-sugar) and fructose (fruit-sugar); *invertase*, which converts cane-sugar into invert-sugar, a mixture of glucose and fructose; and *maltase*, which converts maltose into glucose. In the manuf. of beer, the action is commenced by another enzyme, *diastase*, which is formed in the grains of barley during malting. The diastase converts the starch in the malt into dextrin and maltose. After the introduction of yeast into the wort, the maltose is converted into glucose by the enzyme *maltase*, and the enzyme *zymase* proceeds to set up alcoholic F. The effect of this F. is to break up the sugar into alcohol and carbon dioxide, thus: $C_6H_{12}O_6$ (glucose) = $2C_2H_5O$ (alcohol) + $2CO_2$. It is uncertain whether the chemical action accomplished is due entirely to the enzymes. The living cells produce a far greater effect than do the enzyme-containing juices obtained by breaking up and pressing the cells, indicating that a 'vital action' operates during F. But possibly harmful enzymes are isolated inside the cells.

Acetic fermentation is brought about by a living ferment, *Mycoderma aceti*, which finds its way into weak alcoholic solutions from the air, and, living upon the nitrogenous matter in the solution, causes the alcohol to combine with the oxygen of the air, thus: $C_2H_5O + O_2 = C_2H_4O_2$ (acetic acid) + H_2O . The formation of acetic acid in this way accounts for the souring of beer and light wines when exposed to

the air, and is the basis of the manuf. of vinegar.

Lactic fermentation is caused by a living organism, the lactic ferment, which has the power of causing milk-sugar, or lactose to combine with water to form lactic acid, thus: $C_{12}H_{22}O_{11}$ (lactose) + $H_2O = 4C_3H_5O_3$ (lactic acid). This acid accounts for the sour taste of milk which has been exposed to the air.

Butyric fermentation is caused by a living organism, the butyric ferment, which is present in decomposing cheese. It often accompanies the lactic ferment in which case the lactic acid is broken up with the production of the foul-smelling butyric acid, thus: $2C_3H_5O_3$ (lactic acid) = $C_4H_7O_2$ (butyric acid) + $CO_2 + 2H_2$.

Glycerin by fermentation. If normal sodium sulphite is added to a sugar solution which is then fermented, the main products are acetaldehyde and glycerin, with little alcohol. Glycerin was manufactured in Germany during the First World War on this principle.

Fermentation in digestion.—The higher animals are also capable of producing enzymes. Thus the cells of the salivary glands produce *ptyalin*, which converts starch into sugar, and the gastric tubules produce *pepsin*, which transforms proteins into peptones. See DIGESTION.

Fermo, tn. of the Marches in the prov. of Ascoli Piceno, Italy, 34 m. from Ancona. It is the anct. Forum Piceum, which was founded as a Lat. colony in 264 B.C. after the conquest of the Picentes, and remnants of a Rom. wall still exist. F. is the seat of an archbishop, and contains a cathedral which dates back to 1227. Pop. 21,000.

Fermoy, mrkt. tn. in co. Cork, Eire, about 20 m. from Cork, on the R. Blackwater. It is an important military station, and the barracks on the N. bank of the riv. are one of the most prominent buildings of the tn., the others being the Protestant church, the Rom. Catholic cathedral, and St. Colman's Rom. Catholic College. It is also the centre for salmon and trout fishing on the Blackwater, and has large flour mills. Pop. 7500.

Fern, Male, or *Aspidium filix mas*, one of the commonest wild Brit. species, and grows in woods and hedgerows. The stem is short and rises but little above the ground, but the leaves or fronds, which are pinnate, are from one to three ft. long. The sori are kidney-shaped.

Fern, Sweet, or *Myrica Comptonia*, species of Myricaceæ which has fern-like foliage. It is a shrub with small dillinous flowers and occurs in N. America.

Fernández, John, Portuguese navigator, and reputed to be the first European to visit the interior of Africa. In 1446 he went with an expedition under Antonio Gonzales to Africa, where, being anxious to glean information for his patron, Prince Henry, he remained in the country for seven months after the departure of his companions. His account of his travels among the Desert tribes and W. Africa bears a remarkable resemblance to that of Mungo Park. The dates of his birth and death are not known.

Fernández, Juan, Sp. navigator, who in 1572, while sailing from Peru to Chile, came upon a small group of is. in the Pacific which now bear his name. In 1574, he left Chile, sailing in a south-westerly direction and came upon an is. which so greatly attracted him and his companions that he formed the intention (apparently never carried out) of revisiting it with a larger expedition. It has been conjectured that this is. was New Zealand.

Fernández de Avellaneda, Alonso, pseudonym of a writer who anticipated Cervantes in publishing *Segundo tomo del ingenioso hidalgo don Quijote de la Mancha* in 1614, as a sequel to *Don Quijote*. It is a work of some merit, and was probably undertaken under the supposition that Cervantes would leave his masterpiece unfinished, but it is marred by an insolent preface, in which Avellaneda taunts Cervantes with his physical defects and his moral infirmities.

Fernandina, city and port of entry of Florida, U.S.A., in Nassau co. It is situated on Amelia Is., at the mouth of St. Mary's R.; its harbour opens on the N. to Cumberland Sound, and may be entered at high tide by vessels drawing 20 ft. of water. The chief manufs. are cotton, cigars, lumber, and palmetto fibres. Pop. 3000.

Fernando (de) Noronha, is. in the S. Atlantic belonging to Brazil. It takes its name from its Portuguese discoverer (1503), the Count of Noronha. It has a rugged surface and healthy climate, and is the seat of a Brazilian penal station. Pop. 1100, all males, consisting mainly of criminals and their guards.

Fernando Po, is. in the bight of Biafra, W. Africa, which belongs to Spain and is considered to be one of the most fertile spots on the W. African coast. Its surface is mountainous, and a great portion of the is. is covered with dense forests of valuable timber. The climate is very hot, and a pestilential wind, the 'harmattan', frequently prevails, but is healthy after the rainy season. The chief products are cotton, cocoa, coffee, sugar, tobacco, vanilla, and palm oil. There is regular communication with Liverpool and with the N. country. The prin. settlement is Port Clarence (1500 inhab.) on the N. coast, and the cap. is Sta. Isabel (pop. 8300). The is.'s affairs are administered by a governor-general and council subject to control of the Colonial Dept. in Madrid. Much has been done to develop the resources of the is. and to improve the social services. Pop. 20,000.

Fernán-Núñez, tn. of Spain in the prov. of Cordova, 15 m. S.E. of that city. Pop. 6000.

Ferney, the anct. name for a tn. of France, which in 1788 was officially called Ferney-Voltaire. It is situated at the base of the Juras, 4 m. N.W. of Geneva, in the dept. of Ain. The vil. was founded by Voltaire, who resided there from 1758 until his death in 1778. Pop. 1200.

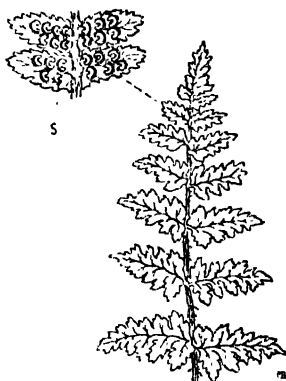
Fernie, city of Brit. Columbia, in the E. Kootenay dist., situated at the junction of Coal Creek with the Elk R. There are

extensive coal-mines in the neighbourhood, and about 480 coke ovens, which supply fuel for the smelting works in southern Brit. Columbia. Almost destroyed by bush fire in 1908. Pop. 4500.

Fernguf, see FERRAGUS.

Fern Isles, or **Ferne Islands**, see FARNE.

Ferns, in the narrower sense of the word, comprise a large number of genera with numerous species, being widely distributed in all parts of the world. They attain their highest development in the tropics. The tree F., characterising the family Cyatheaceae are the largest representatives; they have a woody, unbranched



MALE FERN

S. 501

stem, which bears at the apex a rosette of pinnately compound fronds, which are produced in succession from the terminal bud, and leave, when dead, a large leaf scar on the trunk. The majority of F. are, however, herbaceous and possess a creeping underground stem or rhizome, terminating usually in a rosette of pinnate or deeply divided leaves. A peculiarity common to F. is the coiled position of the young leaves, giving them at the tip the appearance of a crozier, whence their vernation is said to be circinnate, and the leaves continue to grow at the apex until their full size is attained. Peculiar brownish scales, known as paleae orramenta, often fringed, invest the stems, petioles, and sometimes also the leaves of most F. Ferns vary very much as regards their branching; in some, as in the bracken F. (*Pteris aquilina*), the stem forks at the apex; in a few, as in some filmy F., the branching is axillary, like that of flowering plants, while in others, as in some of the tree F., the stem does not branch at all. The roots which are found on a full-grown plant are all adventitious, for the original main root of the embryo dies away very early. The reproduction organs are spores which are produced in cases called sporangia. Each

group of sporangia is known as a sorus which may or may not have a protective covering, the indusium. In most cases the sori are borne on the under surface of the leaves. When ripe the sporangia burst and liberate the spores, which on germination give rise to what is known as a prothallus. The prothallus is a flat, heart-shaped, green body, which leads quite an independent existence, and which produces sexual organs. The male organs (antheridia) and female organs (archegonia) are borne on the under surface of the prothallus. In the antheridia are produced the spermatozoids, which are free-swimming male gametes, and out of these enters an archegonium and fertilises the female gamete contained therein. This process cannot be observed by the naked eye. The fertilised ovum becomes the embryo of the F. plant. Thus the life hist. of a F. presents a true alternation of generations: the F. plant, or sporophyte generation, produces asexual spores, which grow into the gametophyte (prothallus) or sexual generation. This in its turn produces male and female gametes, which after fertilisation grow again into the sporophyte. Occasionally asexual reproduction is effected by budding, as in *Asplenium bulbiferum*.

The form and position of the sori and the presence or absence of an indusium are characters upon which are based the classification of F. Most of the Brit. F. belong to the order Polypodiaceae, which includes *Pteris* (the bracken), *Adiantum* (the maiden-hair), *Asplenium ruta muraria* (the wall rue), *Scolopendrium* (the hart's-tongue), which has entire leaves, *Aspidium*, *Polypodium*, etc., etc. *Osmunda regalis*, the royal fern, belongs to another family; it is peculiar in that the upper pinnae of the leaves are fertile and develop little or no green, so that there is all the appearance of a flower. There are many species of fossil F., which proves them to have formed part of the flora of the geological ages; tree F. are met with in the Devonian period, and many forms were abundant in Carboniferous times.

F. are largely cultivated in gardens and greenhouses for decorative purposes on account of their graceful foliage. Bracken, when dried, can be used for stable purposes and thatching, and its root stock contains starch, which, however, is only used when there is a scarcity of food. The only medicinal F. products are the oil from the male F. and a syrup extracted from the rhizome of an Amer. maiden-hair.

In cultivating F. it is to be remembered that they are shade-loving plants, and like plenty of moisture and soil containing leaf mould. They should be transplanted in early spring or late autumn, and are divided by their rhizomes. This applies to the harder forms. The more tender F. require glass, with uniform temp. and moisture. The soil must be light and well drained, so that the abundance of water which they require will not rot them. They should be repotted before the roots become pot-bound.

Ferns, tn. in co. Wexford, Ire. It has an episcopal palace and was once the seat of a bishop. Pop. 1600.

Ferns, Filmy, see FILMY.

Ferns, Flowering, see OSMUNDA.

Ferozepore, see FIROZPUR.

Ferraboso, Alfonso (1543-88), the Elder, It. musical composer, appears to have settled in England before 1562, but afterwards returned to Italy. He pub. two books of madrigals in 1542 and 1587 respectively, and one of motets in 1541. He was the most important of the It. musicians who lived in England in the sixteenth century.

Ferraboso, Alfonso (c. 1575-1628), the Younger, Eng. musical composer of It. descent, son of Alfonso F. the Elder (q.v.). He was left in England (being probably illegitimate), when his father returned to Italy. It is believed that Queen Elizabeth paid for his musical training; and he became a musician at the court of James I. His works include a number of masques, fancies for the viol, ayres with lute and bass viol, and contributions to Leighton's *Tears or Lamentations*. His three sons Henry (c. 1618-c. 1658), Alfonso (c. 1620-before 1660), and John (1626-1682), were court musicians too, and his daughter Elizabeth (b. 1640) was a singer.

Ferragus, **Ferracute**, **Ferragut**, **Fernguf**, or **Veernagu**, celebrated giant of medieval romance, in which he appears with various attributes. In *Valentine and Orson* he is described as a giant of Portugal who took Bellissant under his care after she had been divorced by Alexander, emperor of Constantinople, and as being in the possession of a brazen head which could answer any question put to it. In Turpin's *Chronicle of Charlemagne* he is a giant 36 ft. high, with the strength of forty men, and invulnerable as regards his skin; while in *Orlando Furioso* he is described as a Saracen, son of Lanfusa. He dropped his helmet in the river, and vowed he would never wear another till he had won that worn by Orlando. Orlando slew him with a wound in the navel, his only vulnerable part.

Ferrandina, tn. of Italy, in Basilicata, situated in the prov. of Potenza, 36 m. S.E. by E. of that place. Pop. 8000.

Ferrar, Nicholas (1592-1637), a theologian, b. in London. He was elected to Parliament in 1621, and took part in the impeachment of the earl of Middlesex. But, foreseeing the outbreak of the struggle between Charles I. and Parliament, he retired to Little Gidding in Huntingdonshire in 1625, where he organised a small religious community. He was visited by Charles I. in 1633, but his 'Arminian nunnery' was broken up by the parliament in 1647. He left in MS. a harmony of the Gospels, and also of the books of Kings and Chronicles.

Ferrara: (1) Prov. of Italy, situated S. of the Po, and W. of the Adriatic. Area, 1019 sq. m. It is a flat surface, and was formerly the main portion of the duchy of F. (formed 1471), and under the house of Este. It was annexed to the Papal States in 1598, and to Sardinia in 1860.

Pop. 381,300. (2) City of Italy on the Po di Volano, 28 m. from Bologna, cap. of the prov. of F., and see of an archbishop. It contains a free univ. (200 students) and was noted for its school of painting in the fifteenth century and as a literary centre in the sixteenth. Besides this, it is interesting as being the former ducal residence of the house of Este, and contains the castle which was built about 1385. There is also the cathedral of San Giorgio, consecrated in 1135; the Gothic Palazzo della Ragione (1315-26), now the law courts; the hospital of St. Anne, where Tasso was confined during his attack of insanity (1579-86); the handsome Renaissance church of San Cristoforo.



W. F. Mansell

FERRARA CATHEDRAL

The tn. was also the asylum of Calvin, Marot, and other reformers, and the bp. of Guarini, Savonarola, and Bentivoglio. In the Second World War widespread damage was suffered by F., which was captured by the Allies on April 24, 1945. Damage was especially heavy near the railway yards but elsewhere, though scattered bombs fell over a wide area, the damage, compared with that suffered by other famous It. cities, was not great or irreparable. But S. Benedetto, a Renaissance church, and sev. minor palazzi were destroyed; others, including the striking Palazzo dei Diamanti, were damaged and the Castello Estense was struck on one draw-bridge tower. In general, however, the complex of houses and palazzi, which give F. its peculiar title to fame and its character received little injury which careful restoration cannot mend. The Chiesa del Gesù was badly blasted inside but the façade is intact; the roof of S. Maria in Vado, one of the oldest churches in F., was shaken but Bononi's elaborate fresco decoration was uninjured. Among the great private palazzi damaged beyond repair were Fracchi, Saraceno, and Strozzi. Pop. 119,300.

Ferrara, Andrea, broadsword-maker of the sixteenth century, was probably a native of Ferrara. He worked with his brother, and in 1585 had acquired a great

reputation as an armourer at Belluno. Many of his swords have been found in Scotland, as well as in the S. and W. of Europe. He is said to have tempered his sword blades by the method employed by the smiths at Damascus.

Ferrari, Gaudenzio (c. 1484-1546), painter and sculptor of the Lombard School, b. at Valuggia, near Novara. He was a pupil of Stefano Scotto at Milan, but made his greatest advance by a minute study of the pictures of Leonardo da Vinci. His works are remarkable for the elevation of their style as well as for the display of difficult and uncommon attitudes. His best are at Varallo, 'The Crucifixion,' a fresco which contains twenty-six life-size figures; 'Scenes in the Life of Christ,' consisting of twenty-one pictures; 'A Glory of Angels,' frescoes at Saronno, near Milan; 'The Martyrdom of St. Catharine,' in the Brera Gallery, Milan; 'Pieta,' in the Royal Gallery, Turin. See B. Berenson, *The North Italian Painters of the Renaissance*, 1907.

Ferrari, Paolo (1822-99), It. dramatist, b. at Modena; he began his literary career at an early age. His works are characterised by their vivacious dialogue and good construction, and fresh, piquant style. Among his works are: *Goldoni e le sue Sedici Commedie* (1852) and *La Satira e Parini* (1858) are critical works. *Il Duello* (1868) and *Gli Uomini Sey* (1869) His *Opere Drammatiche* (1877) have been collected.

Ferraria (in honour of J. B. Ferrari, an It. botanist), the name given to a genus of Iridaceae; they are dwarf plants indigenous to the Cape of Good Hope, and they have glaucous leaves of a dull but sometimes beautiful colour.

Ferrates, salts of ferric acid, H_2FeO_4 . Barium ferrate is obtained as a reddish powder, and is soluble in acetic acid.

Ferreira, Antonio (1528-1569). One of the classic poets of Portugal, b. at Lisbon. He was judge of the supreme court at Lisbon, composing in his leisure the poetry which earned for him the sobriquet of 'the Portuguese Horace,' and gave him a reputation equal to that of Camões. He wrote numerous striking sonnets, elegies and odes, but his poetic fame rests mainly on his epistles. Also wrote dramas, such as *Sophonisba* and *Ines de Castro*, in which he invested with the forms of Gk. tragedy the most poignant and popular events of Portuguese chronicles; and a comedy, *Cinco*. His collected works pub. in Lisbon (1771) and Paris and Rio de Janeiro (1865). He died of the plague. See life by J. de Castilho, 1865.

Ferrel's Law is that everything moving on the earth's surface is subject to a deflecting force owing to the rotation of the earth—in the N. hemisphere the force deflects to the right, and in the S. hemisphere to the left. This is especially applicable to the air when in motion—the winds of the N. hemisphere being deflected to the right and those of the S. to the left.

Ferrer, Francisco (1850-1900), Sp. revolutionary and teacher, b. at Alcala,

near Barcelona. After taking part in an insurrection in Spain, he earned a precarious living in Paris for a time as a teacher. In 1901 he opened a school, the *Escuela Moderna*, in Barcelona. This school was really a propagandist centre, though it did much for educational reform in Spain. After the attempt in 1906 by Mateo Morral on the lives of the king and queen of Spain, F. was arrested and the school closed. F. was, however, acquitted only to be again arrested, in 1909, for taking part in riots in Barcelona. Convicted on hearsay evidence, he was condemned to death by the Council of War and executed. See life by W. Archer, 1911.

Ferrers, Lawrence Shirley, Earl (1720-1760), was the last member of the peerage who was put to death as a criminal in England. In the year 1760, while in a fit of temper, he shot his steward, for which crime he was convicted of murder by his peers and hanged at Tyburn.

Ferret, animal belonging to the family Mustelidae, other species being the badger, weasel, otter, and polecat. The F. is the domesticated albino variety of the latter animal, both of them belonging to the genus *Putorius*. It is very similar to the wild polecat, but a little smaller, being about 14 in. long, has yellowish-white fur and pink eyes. Sometimes, however, F.s. breed with polecats, and the result is a cross-breed having fur tinged with brown. The F. is not altogether tame, and occasionally it becomes quite ferocious, exhibiting no affection whatever. The female F. breeds twice during the year, producing from six to nine young ones each time, and she has been known to devour them. This animal was known among the Romans, who employed it, and it is said that it was brought from Africa to the S. parts of Europe. It is used especially to hunt rabbits, and to kill rats. See N. Everett, *Ferrets*, 1897; W. D. Drury, *Ferrets and Ferreting*, 1927.

Ferriocyanogen, Ferriocyanides, Ferrocyanogen, and Ferrocyanides. *Ferriocyanogen* and *Ferrocyanogen* are two isomeric compound radicals containing cyanogen and iron, whose exact chemical structure has only recently been elucidated. The ferriocyanogen compounds are either prepared from the potassium salt or from the cyanogen compounds obtained as by-products in the coal-gas manuf. or synthetically. *Potassium Ferriocyanide* is produced by heating crude potash in an iron pot closed by a lid having an aperture through which iron filings and certain animal matter, as feathers, horns, and leather, are introduced. The reaction is not well understood, but when the fused mass is lixiviated potassium ferriocyanide ($K_3Fe(CN)_6$) is contained in the solution. It forms quadratic pyramidal crystals of lemon-yellow colour soluble in warm water. It is used in calico-printing and in the preparation of Prussian blue, etc. The *ferrocyanides* of sodium, calcium, zinc, barium, strontium, and many other metals have also been prepared, and sev. insoluble ferriocyanides are made by double decomposition.

Thus copper sulphate and potassium ferriocyanide solutions mixed give soluble potassium sulphate and a brown coloured precipitate of cupric ferriocyanide ($Cu_2Fe(CN)_6$). This is used in the preparation of semi-permeable membranes (see Osmosis). *Ferriocyanic Acid* is obtained by adding pure hydrochloric acid to an equal volume of a saturated solution of potassium ferriocyanide, excluding air as far as possible. It is a white powder crystallising in small needles, is soluble in water and alcohol, and readily oxidises on exposure to air. *Potassium Ferriocyanide*, or red prussiate of potash, $K_3Fe(CN)_6$, is formed when potassium ferriocyanide is oxidised, e.g. by bromine water. It crystallises in dark red prisms and is a powerful oxidising agent. Many insoluble ferriocyanides can be made from a soluble ferriocyanide and a soluble metallic salt. *Hydroferriocyanic Acid* or *ferriocyanic acid* ($H_3Fe(CN)_6$), made by adding three volumes of very strong hydrochloric acid to one of strong potassium ferriocyanide, is a brown-green crystalline body. *Hydrogen Ferrous Ferriocyanide* is a white powder obtained by boiling an aqueous solution of ferriocyanic acid. The potassium salt, when heated with dilute nitric acid, forms Prussian Blue, which exists in sev. varieties, e.g. *soluble Prussian Blue*, *insoluble Prussian Blue*, *Williamson's Blue*, and *Turnbull's Blue*. Prussian Blue itself is hydrated ferric ferriocyanide; the soluble Prussian Blues are hydrates of potassium ferric ferriocyanide, $KFeFe(CN)_6 \cdot nH_2O$. The iron atoms in Prussian Blue are arranged, ferrous and ferric alternately, at the corners of a cubic lattice, and the CN groups lie in the edges of these cubes. The potassium atoms lie at the centres of alternate cubes. Prussian Blue is used as a pigment.

Ferric and Ferrus Salts, see IRON.

Ferrier, Sir David (1813-1928), Scottish physician, b. Jan. 13, at Woodside, Aberdeen, and educated at the univ. there and also at Heidelberg. He became F.R.S. 1876; and was appointed prof. of neuropathology in King's College, London, 1889. He made experimental researches on the functions and diseases of the brain and wrote many medical works—including *Functions of the Brain* (1876), and *Localisation of Cerebral Diseases* (1878, 1890). He was a founder, and for a time editor, of *Brain: a Journal of Neurology*. President of the Medical Soc. of London, 1913.

Ferrier, James Frederick (1808-61), Scottish metaphysician, b. in Edinburgh, and the nephew of Susan F. and of John Wilson ('Christopher North'). Educated at Edinburgh High School and Univ. and at Magdalen College, Oxford, he was called to the Scottish Bar (1832), and appointed professor of civil hist. at Edinburgh (1842), and prof. of moral philosophy and political economy at St. Andrews (1845). After having contributed various metaphysical essays to the *Blackwood*, he pub. *The Crisis of Modern Speculation* (1841), *Berkeley and Idealism* (1842), and *Institutes of Metaphysics* (1854). His *Lectures on Greek Metaphysics*

were ed. in 1866 by Sir A. Grant, who also wrote a life. See also life by E. S. Haldane, 1899.

Ferrier, Paul (1843-1920), Fr. playwright, b. March 29, at Montpellier. His plays include *La Reranche d'Iris* (1868), *Chez l'Avocat* and *Les Incendies de Moussolard* (1873), *Les Mousquetaires au Couvent* (1880), *Habolin* (1884), *Joséphine vendue par ses Sœurs*, a famous opéra-bouffe with music by Victor Rogor (1886), *Le Fétiche* (1890), *Le Carillon* (1896), and certain opéra-libretti, including a collaboration with V. Sardou, *La Fille du Tabarin* (1901).

Ferrier, Susan Edmonstone (1782-1854), Scottish novelist, b. in Edinburgh, the daughter of James F., a clerk of the Court of Session with Sir Walter Scott. Her first work, in which Miss Clavering collaborated for a short time, was *Marriage*, which appeared in 1818, and was followed by *The Inheritance* (1824) and *Destiny, or the Chief's Daughter* (1831). These novels are very lively presentations of Scottish society, and show a rare gift of observation. They were all pub. anonymously, and many conjectures were made as to their authorship; some people attributed them to Scott, who greatly admired her writings and of whom she wrote in her *Recollections of Visits to Ashiestiel and Abbotsford*, pub. with a memoir in Bentley's ed. of her works (6 vols.), 1882. See Sir C. Douglas, *The Blackwood Group*, 1897; and Doyle's memoir in vol. iv. of Lady Margaret Sackville's ed. of *The Works of Susan Ferrier*, 1928.

Ferring, seaside resort, near Worthing, Sussex, England. It is situated between the S. Downs and the sea 1 m. N. of Worthing—with which it is incorporated. There is a prehistoric camp and the site of a Saxon cemetery, which were purchased for the National Trust in 1938 by the W. Sussex Co. Council and the Worthing Corporation.

Ferro, see **HIÉRO**.

Ferro-concrete, another name for 'reinforced concrete,' first used for building purposes in America. See **CONCRETE**.

Ferrol, El, seaport of Spain in the prov. of Corunna, on the N.W. coast of the bay of Belanzos, 12 m. N.E. of the tn. of Corunna. It is strongly fortified and possesses a naval arsenal, dockyard, wharves, quays, etc. There is a wireless station at F. There is a large, safe harbour, but its entrance is narrow and defended by a couple of forts. The manufs. are leather, linen, and cotton goods, naval stores, rope, and sail-cloth; the exports are brandy, vinegar, corn, and fish, old iron and copper. There are sev. fine public buildings, including naval barracks, tn. hall, two hospitals, jail, monastery, and churches. It fell to the insurgents early in the Civil war of 1936. Pop. 62,400.

Ferro-manganese, commercial alloy consisting of: iron, 4 to 6 per cent; manganese, 50 to 80 per cent; carbon, 5 to 6 per cent; and silicon in small and varying amounts. It is used commercially in the manuf. of other alloys, and chemically as a reducing agent.

Ferro-silicon, alloy consisting of: silicon, 10 to 12 per cent; manganese, 2 to 3 per cent; carbon, 6 per cent; and iron 80 per cent. It is used in the formation of other alloys of iron or silicon, and also as a reducing agent.

Ferrottype, or **Energiatype**, photographic process of developing negatives by means of a solution of protosulphate of iron and mucilage of gum-arabic. It was discovered by Robert Hunt in 1844.

Ferry (passage by boat across riv.). This word has the same root as the word 'fare,' and is allied to the Ger. *fahren*, to travel, and to the Lat. *fero*, I bear. F. is the term applied to the place where passengers can be conveyed across either an arm of the sea, as at S. Haven Point to The Sandbank, at the head of Studland Bay, in Dorset, England, or across a riv., as at Twickenham near London. It is also the name given to the boat which holds the passengers. The right to F. is a franchise or royal grant, and has the same legal significance as the right to hold a fair or mkt. It has nothing to do with the ownership of land or water. The possessor of the F. is not entitled to ownership of the stretch of water across which his passengers are ferried. He merely has the right to exact reasonable toll for the service he has rendered in supplying boats for the landing of passengers on the other side. He is, moreover, responsible for the condition of his boats and for the ferrymen he employs. No one is allowed to set up an opposition F. unless authorised by Act of Parliament. Car-ferries or train-ferries are vessels used for trains, and have railway-lines thrown across their decks, enabling the cars to run on and off the vessels on their own wheels. There are many varieties of F. boats, such as rafts, flat-bottomed barges with inclined planes for horses. The flying-bridge is worked by means of a long rope or chain attached to a fixed buoy in the middle of the riv., and is useful in military operations. Proposals for improving 32 Fs. and starting new Fs. were made by the Ferries Committee's report to the minister of transport, June 1948 (*Ferries in Great Britain*, H.M.S.O. 1948). Other recommendations ranged from the provision of additional or larger vessels, to the use of radar or other navigational devices on services liable to interruption by fog. The report also recommended that highway authorities should be empowered to take over Fs. linking trunk or classified roads and that these should be treated as part of the highways and freed from tolls, expenditure being met in part by gov. grants. In Britain 44 vehicular Fs. are normally in use, five of them free from tolls.

Ferry, Jules François Camille (1832-93), Fr. statesman, b. at Saint Dié, Vosges. He studied for the bar, but gave up this profession and devoted himself to politics instead. Elected Republican deputy for Paris in 1869, he strongly urged that peaceful relations should be maintained between France and Germany, but without avail. Created prefect of the Seine in 1870, he had the full responsi-

bility of the siege of Paris, and was forced to resign his prefectship in 1871. He became a member of the Republican ministry formed in 1870, and eventually became minister of education and then minister of Foreign Affairs. He was elected Premier on two occasions, and it was due to his administration that two important measures were carried out, the organisation of public education free from clerical interference, and the colonial expansion of the Fr. empire. A Fr. protectorate was formed in Tunis (1881), and the conquest of Indo-China, and exploration of the Congo and Niger dists. were planned. But his spirited colonial policy involved France in war in Madagascar, and brought about his own downfall in 1885. He performed another service for his country in preparing the terms of the peace with China. He was assassinated by a madman. — See lives by A. N. Rambaud, 1903, and A. Billot, 1904, and A. Israel, *L'École de la République: le grand œuvre de Jules Ferry*, 1931.

Ferryhill, tn. in Durham, co. of England, 6 m. S. of Durham, with iron works. Coal-mining is carried on in the vicinity. Pop. 10,000.

Ferry-Port-on-Craig, see TAYPORT.

Fersen, Hans Axel. Count (1753–1810), Swedish marshal; b. a. Stockholm: son of Fredrik Axel, Count F., of Scottish descent, from McPhersons. Colonel in Royal Swedish regiment of Louis XVI. of France, served in Amer. War of Independence. In flight of Louis and Marie Antoinette to Varennes, June 1791, F. made the preparations and accompanied them. Made marshal of Sweden in 1793, and Chancellor of Upsala Univ. in 1799. Murdered by populace in Stockholm tn.-hall, June 20, on account of a false belief that he had poisoned the crown-prince Charles Augustus.

Ferté-sous-Jouarre, La, tn. and riv.-port of France in the dept. of Seine-et-Marne. It is situated on the Marne, in the arron. of, and 12 m. E. of the tn. of Meaux. Pop. 4600.

Fertilisation, fusion of sexual elements in the reproductive processes of animals and plants. The essential fact of F. is that a gamete or sexual cell from the reproductive tissues of one parent becomes so intimately associated with a gamete from the reproductive tissues of the other parent as to form one cell called a zygote, which becomes the starting point of a new living individual. Where there is no F. in the process of reproduction, the development of the new organism is called *parthenogenesis*. In some of the lower plants and animals the fusing gametes are indistinguishable in form, size, and other characteristics. Such sexual processes are called isogamous, and the term conjugation is to be preferred to F. The term F. now becomes restricted to that process by which a cell derived from the specialised tissues of a parent known as male is united to a cell derived from corresponding specialised tissues in the female parent. It is therefore a process characteristic of the higher animals and plants where sexual organs

are differentiated into male and female. In animals the organs from which the gametes are derived are the testes in the male and the ovaries in the females. The male gamete is the spermatozoon, a small cell of elongated form. The nucleus is situated in the 'head' or thickened part, and the remainder consists of a vibratile tail by which the cell moves freely in a liquid medium. The female gamete is the ovum, a cell usually much larger than the spermatozoon. It is quiescent or non-motile, contains a large nucleus and a large amount of nutritive material enclosed in a protecting membrane. Ova are produced in small quantities, while spermatozoa are relatively far more numerous. The ovum and spermatozoon come into conjunction by the admixture of the seminal fluid in the sexual act. The actual fact of F. consists of the penetration of the envelope of the ovum by the spermatozoon. This is probably brought about by *chemiotaxis*, or attraction of a chemical nature exerted mutually by the male and female elements. What happens is that the nucleus of the spermatozoon enters the ovum and sometimes the centrosome does so. With the formation of the zygote by this fusion of cells, the embryonic hist. of the new organism begins. In plants there are many modes of the sexual process. In certain algae, similar gametes, furnished with cilia, move about in the water and eventually fuse; this process is isogamous. In other plants the male cell is a spermatozoid which visits the female cell. In the mosses, for example, the spermatozooids are developed in large numbers in the *antheridium*, and are set free to move in the water by means of two vibratile cilia. The *archegonium* contains the ovum at the bottom of its flask-shaped structure. When the ovum is ready for F., a passage is opened through the archegonium, through which the spermatozoid reaches the ovum. In the phanerogams, or flowering plants, the male element is contained in the pollen of the stamen, which has to be conveyed in some manner to the female element, the ovule of the stigma. F. in flowers is therefore necessarily preceded by pollination, and the special structure of the flower is adapted to that end. Wind is often an active agent in pollination; in this case the pollen is produced in enormous quantity and the stigmas are often feathery so as to catch the pollen. Insects are, however, the great carriers of pollen, and the colour and scent of the flower serve to guide the appropriate insects to their favourite flowers. When the pollination is effected, the male cell passes from the pollen-tube into the female cell, and a zygote is the result of the fusion. It has been shown that cross F. is the rule even when male and female organs are found on the same individual. In many cases this is ensured by the male and female elements in the same plant ripening at different times. The chemical attraction which effects the fusion is only operative between cells of a certain degree of affinity, that is, it generally means that F. can only take

place between cells of individuals of the same species. In that one phenomenon the potential characteristics of both parents are fused, and may reappear in the new organism when developed (see MENDELISM). See Wilson, *The Cell in Development and Inheritance*, 1902; D. M. Mottier, *Fecundation in Plants*; F. H. A. Marshall, *The Physiology of Reproduction*, 1932; R. Kuczyński, *Fertility and Reproduction*, 1933.

Fertilisers, see MANURES.

Fertility of Soil, see SOIL.

Fertit, Dar (region of Central Sudan), see DAR-FUR.

Fertő-tava, or Neusiedler-See, lake of Hungary, between the counties of Oedenburg and Wieselburg, 19 m. from Pressburg. It has an area of about 120 sq. m., but it is of varying size, and sometimes dries up in part. Eastward it is united with the extensive marsh called the Hanság, through which it is in communication with the R. Raab and with the Danube.

Fescennine Verses (*Fescennina carmina*), early form of popular poetry in Italy. They took the form of a dialogue, usually in the Saturnian metre, and were composed extempore at weddings and other private festivals. They became so licentious that the practice had to be suppressed by law. See Horace, *Epistles*, li. 1, and Virgil, *Georgics*, li.

Fescue grass, name given to a genus of grasses (q.v.); *Festuca pratensis*, the meadow fescue, and *F. rubra*, the red fescue, are common species.

Fess, or Fesse, in heraldry, one of the honourable ordinaries containing a third of the field. It is regarded by some authorities as having been a belt of honour, given as a reward by kings for service in the army. 'Per Fess' is when the field is equally divided by a horizontal line. 'Per Fess and Pale' means that the field is to be divided into thirds, by the F. line and the Pale line, from the F. point to the middle base point.

Fessler, Ignaz Aurelius (1756-1839), Hungarian historian. Educated at Pressburg and Raab. Became a Capuchin monk in 1773. Called to chair of Oriental languages and hermeneutics of O.T. at Lemberg, renounced the monastic state and became a Freemason. Became Protestant; lived in Berlin, from 1809 in St. Petersburg—where he lost his professorship because charged with atheism. In 1833 was made gen. supt. of Lutherans of St. Petersburg. He wrote *Die Geschichte der Ungarn und deren Lausassen* (1815-25), some historical novels, and an autobiography, *Rückblicke auf meine siebenjährige Pilgerschaft* (1824).

Festa, Constanzo (d. 1545), It. composer of madrigals and motets. In 1517 he was appointed singer in the Vatican. F. is chiefly remembered for his very popular madrigal *Down in a Flowery Vale*, which was trans. by Thomas Oliphant.

Festival, see FEAST.

Festoon, in architecture, sculptural wreath or garland, formed of conventional flowers, fruit, and leaves, suspended by ribbons from a knob or an animal's head.

It was used by the Gks. and Romans, probably in imitation of the garlands of flowers that were hung about a sacrificial victim or altar. It may be found as a decorative feature in many Renaissance buildings.

Festubert, Battle of (N. France, 20 m. S.W. Lille). A famous battle in the First World War. On May 9, 1915, Sir Douglas Haig opened an attack on the Gers. just N. of Fromelles and also between Neuve Chapelle and Givenchy, F. being in the latter sector. This attack was undertaken in pursuance of a promise made by Sir J. French to Marshal Joffre to keep the enemy occupied on his front as long as possible. Some ground was gained about Fromelles, but the Ger. machine gunners on the Aubers Ridge held up the advance in that area. Progress was arrested for the next few days by dull and misty weather, rendering artillery observation difficult. On May 15 the attack was resumed between Richebourg-L'Avoué and F., in which the Canadian Div. distinguished itself. On May 16 the 7th Div. made good progress immediately due E. of F., having for its objective the line Rue d'Ouvvert-Canteleux.

By the capture of the orchard at F. on May 20 the Canadians again distinguished themselves. This position had been strongly fortified by the Gers. The preliminary bombardment drove most of the Gers. to cover, and this enabled the 16th Canadian Scottish to clear the wire entanglement at the edge of the orchard by going through a ditch up to their necks in mud and water. When the bombardment lifted to permit the assault to take place, the Gers. streamed back to their trenches, which had only been manned by machine-gun crews during the shelling, but the Canadians were prepared for them and forced them to retreat. The lack of shells generally was a serious handicap to the Brit. commander, as these were necessary to destroy the Ger. machine gunners who worked great havoc among the attackers. It was this circumstance which mainly decided Sir J. French to cease further attacks and to strengthen and consolidate the ground that had been gained. The result of the battle of F. was to deprive the Gers. of a highly entrenched and fortified area on a four-mile front. Their losses in personnel and material also were heavy. The lack of shells, known politically as the 'shell scandal,' led to the creation of the ministry of munitions.

Festus, Porcius, fl. during the reign of Claudius, and succeeded Felix as procurator in Judaea, A.D. 62. In the following year, when St. Paul was brought before him, he admitted the innocence of the apostle.

Festus, Sextus Pompeius, a Rom. grammarian who flourished during the third or fourth century A.D. He compiled a glossary of Lat. words and phrases. *De Verborum Significatione*, part of which is extant. Consult the ed. of C. O. Müller (new ed. 1880).

Fet, or Feth, Afanasi (1820-1892), Russian poet, b. at Novosseiski, in the

gov. of Orel. He took the name of Feth, which was that of the first husband of his mother, although his true name was Chenochine. From 1844 to 1856 he served in the army, finally retiring with the rank of captain in the cavalry of the guard. From 1860 he lived as a country gentleman on his estates. Encouraged by Turgenev he pub. a book of poems in 1856. A new ed. was issued in 1863, which was sharply attacked because Feth as a reactionary opposed the freedom of the serfs. An impressionist in verse, he deals largely with little etelings of his native land and in love poems. At the age of 63 he surprised Russia with one of his best books—*Evening Fires*. He also made excellent trans. of the Lat. poets and of Shakespeare, Goethe, and Schopenhauer. His memoirs were pub. in 1890 and collected poems in 1901.

Fetiales (Lat. *fari*, to speak), Rom. priests who acted on behalf of Rome in international affairs and at time of foreign wars. They made diplomatic negotiations with other countries, decided when it was necessary to declare war, and offered thanksgiving sacrifices when peace was made.

Fétis, François Joseph (1784-1871), Belgian musical critic and composer. b. at Mons, and trained by his father and at Paris. He was appointed organist and prof. of music at Donal (1813); prof. at the Conservatoire, Paris (1821); director of the Conservatoire, Brussels, and chapel-master to Leopold I. (1833). In 1827 he founded the *Revue Musicale*, and wrote a *Biographie universelle des musiciens* (1841), *Esquisse de l'histoire de l'harmonie* (1840), *Histoire générale de la musique* (1869-76), and, in collaboration with Moscheles, *Méthode des Méthodes de Piano* (1837). He also composed sev. operas and oratorios. See W. Gurlitt, *Fétis und seine Rolle in der Musikwissenschaft*, 1930.

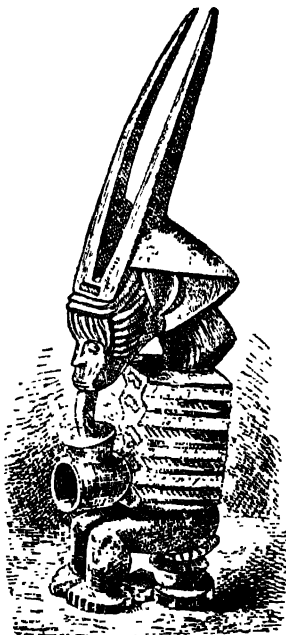
Fetichism, or Fetichism, the worship of inanimate objects which are believed to be possessed with spirits; the word is also used to indicate the use of charms, which, though not the habitation of spirits, are supposed to have a magical influence, derived from spirits, of warding off danger and bad luck. This cult is prevalent among many uncivilised or semi-civilised races, and flourishes especially among W. African tribes. The word is derived from Portuguese *fetico*, a charm, and was first used in its present sense by fifteenth century Portuguese explorers of the stones, wooden figures, beads, etc., worshipped by negroes. See also AMULET. See A. B. Ellis, *Tshi-speaking Peoples of the Gold Coast*, 1887; R. H. Nassau, *Fetichism in West Africa*, 1904; R. E. Denett, *At the Back of the Black Man's Mind*, 1906; R. H. Milligan, *The Fetish Folk of West Africa*, 1912.

The term F. is also used in psychology to describe types of obsessional mental or nervous disorder.

Fettes College, Edinburgh, was founded by Sir Wm. Fettes (d. 1836), who left a large endowment for the purpose of educating orphans and children in unfortunate circumstances. The trust funds

were allowed to accumulate till 1864, when the buildings were begun. The college was opened in 1876, and the administration is similar to that of an ordinary public school.

Feu and Feu-duty. In Scottish law, F. is a mode of land tenure which gives the tenant the right of holding certain property, in return for which he makes an ann. payment in money, cattle, grain, or in kind, called feu-duty. The land is held from the crown, but the crown vassals may give out their land in F. to their vassals, who in turn may F. the land. This process of subinfeudation was prohibited in England by the statute of Quia Emptores in 1290. Consult Rankine's *Law of Landownership in Scotland*.



A NIGER FETISH

Feuchtersleben, Ernst, Freiherr von (1806-49), Austrian poet and physician; b. in Vienna, of an old Saxon family. Secretary to the Society of Physicians. From 1844, delivered lectures on training of psychic physicians. From 1847, vice-director of medico-surgical studies; in 1848 for a little while under-secretary of state for education. Works include: *Die Lehre von den Heilanzeigen* (in Lat.) (1833), *Über das Hippokratische erste Buch von der Diät* (1835), *Gedichte* (containing

'Es ist bestimmt in Gottes Rat,' set to music by Mendelssohn, 1836). *Zur Dittetik der Seele* (1838), *Über die Gewissheit und Würde der Heilkunst* (1839—now ed., entitled *Physician and Public*, 1848), *Beiträge zur Literatur-, Kunst-, und Lebenstheorie* (1837—41), and *Lehrbuch der ärztlichen Seelenkunde* (1845).

Feuchtwanger, Lion, Ger. author; b. 1884, at Munich, of a Jewish family. Studied philosophy in Berlin and Munich. In 1907 he pub. a widely-noticed dissertation on Heine's fragment *Der Rabbi von Bacherach*; also a play, *Der Fetisch*. In 1910 appeared his first novel, *Der tönerne Gott*. In 1916 came a tragedy, *Julia Farnese*; also a refurbishing of the old Ger. play *Vasantasena*. He adapted *The Persæ* of Æschylus in 1917; and the *Acharnians* and *Peace* of Aristophanes in the burlesque *Friede* (1918). Of his dramas, *Warren Hastings* appeared in 1916, and *Jud Suss* and *König und Tänzerin* in 1917. He pub. the novel *Die hässliche Herzogin* (*The Ugly Duchess*) in 1923, and the famous one *Jud Suss* in 1925. The latter was trans. into Eng. as *Jew Suss* in 1926. It is a story of Germany in the eighteenth century, a wonderful combination of Teutonic thoroughness of workmanship and Heb. imagination. Later plays: *Die Petroleuminseln*, with *Kalkutta*, 4 *Mai* and *Wird Hill amnestiert?* (1927). His *Success* (1930) bears a close resemblance to Zweig's famous novel, *The Case of Sergeant Grischka*, being founded on the theme of the unavailing attempts of a determined woman to secure the freedom of a man wrongly condemned to prison. The setting is pre-war Bavaria and the picture presented of political, social, and moral chaos is, as it is intended to be, profoundly disturbing. Like *Jew Suss* it is sketched on a great canvas, comprising scores of characters and all of them intensely vital. His novel *Josephus*, based on the life of the Jewish historian, was pub. in Eng. in 1933. Other works include *The Oppermans* (1933), *The Jew of Rome* (1935), *The False Nero* (1937), *The Devil in France* (1941), *Simone* (novel) (1944), *Proud Destiny* (1947). F. lives in California.

Féud (Middle Eng. *fede*, through the Fr., from Old High Ger. *fehida*. Cf. O.E. *fāh*, foe), a lasting quarrel, often resulting in warfare, between two families, clans, or tribes. See BLOOD, AVENGER OF; VENDETTA.

Feudalism (Late Lat. *feodum*, or *feudum*, a fee or fief), one of the most influential of medieval institutions, gave rise to legal principles and social ideas which are not by any means extinct at the present time. The question of the origin of F. is one of the most difficult in institutional hist.; the main points are now generally settled, though differences of opinion still exist as to points of detail. Institutions have existed in Japan, Africa, and many other places, to which the term 'feudal' might with justice be applied, but when the term F. or 'feudal system' is used without any qualification, the system of medieval W. Europe is always meant. This system came into

existence in the eighth and ninth centuries, owing to the inability of the central gov. to cope with the disorders of the period. Within the limits of this article any detail is impossible, but a few broad principles and tendencies may be pointed out. The two main features of F. are of Rom. origin; one related to land and the tenure by which it is held, and the other to the personal relationship of individuals. The latter was known in the time of the Rom. empire as 'patrocinium', a poor and landless freeman goes to the rich landowner who can afford him protection, states his need, and offers such services as a freeman may perform in exchange for shelter and support. The other institution was the 'precarium'; under this form the owner granted the use of a piece of land to another. The object of this practice was not to obtain income, but to serve a friend, to reward a dependent, or to secure a debt, etc. Its chief characteristic from a legal point of view was that the lessee had no right of any kind against the grantor, as the land was revocable at the will of the owner with no penalty. When a small landowner was in trouble, he made over his land as a gift to a rich landowner near, and received it back as a precarium: this process was known as 'patrocinium fundorum.' These two practices were the foundation of the later feudal system, but they were in their early stages entirely distinct; the personal relation did not connote the precarium, nor did the holding of land involve any obligation of the patrocinium. When the Franks entered Gaul and found these customs prevalent, together with many other Rom. institutions, they not only permitted their continuance, but legalised them. In this they were in all probability influenced by the pre-existence of the institution of the 'comitatus,' which had much in common with the patrocinium. The latter had held no stigma for either of the parties entering into it, but in the case of the comitatus, not only was there no disgrace, but the transaction was considered to confer honour on both the chief and the dependent. All these ideas and customs, such as special ceremonies and oaths of allegiance, passed from the comitatus into the feudal system. The idea of the precarium also would not be totally opposed to Frankish ideas, though the practice was mostly carried on by the great landowners until the beginning of the Carolingian period. The church was the chief agent in carrying over the precarium from the Rom. to the Ger. state; frequently grants of land were made by the Church on this system. The Merovingian period was not distinguished by any great change in the character of feudal institutions; the legalisation of the Rom. practices was the great achievement of that age. The most necessary steps to the formation of the historical feudal system were taken in the Carolingian period; those are the steps by which the two institutions of the patrocinium and precarium became two sides of a single system. Military service had

not previously been connected with the Rom. or Merovingian institutions, and the Carolingian age is remarkable as the period during which military service was estab. as a necessary corollary of F. Such a step was not made in a short time, and the whole epoch is occupied with the development of the change. Charles Martel made use of very extensive church lands to be given to his followers in order that being thus relieved of some expense, they might be able to furnish cavalry to repulse the Arabian attack on Gaul; the method used was called 'precarie verbo regis.' This was the first step towards the unification of the two institutions; about this time the word 'benefice' displaced precarium and 'commendation' was used instead of patrocinium. The judicial functions of the state also passed into private hands during this period. As a result of the extension of the principle of military service, the duty of defending the state changed from a public obligation to a private agreement. So full sovereignty was exercised by the great lords over all residing within their 'fief,' as the benefice was called at this later period. The process by which this change came about is obscure, and many differing views are held on the subject; in the majority of cases the view of M. E. Beaudouin is probably correct, that such power was usurped, owing to the strong local power of the landowner. In the ideal feudal system the fief and the vassal are always connected; the vassal always receives a fief, and a fief is held by none other than a vassal. Estates of allodial land, that is land which the original owner had held in fee-simple, not as a benefice, frequently formed little states of their own; if the pretensions of the owner were made good, they were distinctly recognised by the general gov. as independent states. F. was prevalent over W. Europe from the tenth to the thirteenth century; even where allodial lands were numerous, the real gov. was completely local. At the same time it is noteworthy that the theory of the state, with an almost absolute king at its head, was never totally allowed to lapse even in the palmiest days of the feudal system. The kings themselves never allowed the barons' claim to independence, and thus the decline of F. was simply the conversion of theories into facts once more. The ideal feudal system may be seen in the legal theory (see Blackstone's *Commentaries*), and this theory corresponds generally to the actual facts prevailing. But it must be remembered that such a regular organisation as outlined in the legal theory nowhere existed in practice. A rough system of organisation was what obtained in most places, and no satisfactory idea of wages or details can here be given. The national feudal systems of the different countries of Europe presented many constitutional points of difference, and so exercised a different influence on the history of each country. See ENGLISH LAW and HISTORY, FRANCE, GERMAN, SCOTLAND, etc., for details of these systems. See also FIEF, HIDEN, KNIGHT

SERVICE, SCUTAGE, VASSAL, VILLEINAGE, etc. See Léon Gautier, *La Chevalerie*, 1884 (trans. by H. Frith, 1889); V. Menzel, *Die Entstehung des Lebenswesens*, 1890; E. de Laveleye, *De la propriété et de ses formes primitives*, 1891; J. H. Round, *Feudal England*, 1895, and *Domesday Book and Beyond*, 1897; J. T. Abdy, *Feudalism*, 1896; H. Brunner, *Grundzüge der deutschen Rechtsgeschichte*, 1901; P. Vinogradoff, *English Society in the 11th Century*, 1908; J. Calmette, *La Société féodale*, 1923; W. S. Davis, *Life on a Medieval Barony*, 1923; L. F. Salzman, *English Life in the Middle Ages*, 1926; M. Bloch, *La Société féodale*, 1939-40.

Feu de joie, discharge of musketry given as a salute on occasions of public rejoicings. The guns are let off one after another at quick but regular intervals, thus producing a running fire.

Feuerbach, Ln. of Württemberg-Baden, Germany, 2½ m. N.W. of Stuttgart. Pop. 18,000.

Feuerbach, Anselm (1829-80), Ger. painter, b. at Speyer. His first work of great merit was 'Haiz at the Fountain,' 1852. After a visit to Italy, his subjects were drawn largely from anct. hist. and mythology, and before long he was recognised as the leading painter of the Ger. classic school. His chief works are: 'Iphigenia in Tauris,' 'Orpheus and Eurydice,' 'Plotà,' and 'Dante at Ravenna.' See lives by Allgeyer-Neumann, 2nd ed., 1904; O. Fischer, 1922; and L. Zahn, 1940.

Feuerbach, Ludwig Andreas (1801-72), Ger. philosopher, fourth son of Paul J. A. Feuerbach, b. at Landshut in Bavaria, and educated at Heidelberg, Berlin, and Erlangen. His first work, *Gedanken über Tod und Unsterblichkeit* (1830) an attack on the doctrine of personal immortality, was followed by *Abolard und Heloise*, 1834. In 1837 he married a woman of some means, and was thus enabled to devote his time to study and reading, which resulted in the pub. of *Das Wesen des Christentums* (1841), trans. into Eng. by George Eliot under the title of *The Essence of Religion* (1853). This work is an interesting attempt to prove that God, or the Absolute, is an outward projection of man's inner self, only existing in the human consciousness of the infinite. F. thus denies the existence of God apart from man, and that the highest good is created in man's consciousness as an expression of his human needs. He was made much of by the revolutionary party, who degraded his philosophy into atheism. His complete works appeared in ten vols. (1846-66, new ed. 1903-11). See K. Grün, *Feuerbach in seinem Bruchwechsel und Nachlass*, 1874; M. Meyer, *Ludwig Feuerbachs Moralphilosophie*, 1899; F. Engels, *Feuerbach und der Ausgang der klassischen Philosophie*, 1888, 1903; A. Löwy, *La Philosophie de Feuerbach*, 1904; K. Barth, *Geschichte der protestantischen Theologie, seit Schleiermacher*, 1943.

Feuerbach, Paul Johann Anselm Ritter von (1775-1833), celebrated Ger. writer on criminal law, b. at Frankfurt-on-Main,

and educated at the univ. of Jena. His *Kritik des natürlichen Rechts* (1796), followed by *Anti-Hobbes* (1798), attracted much attention, and in 1801 he was appointed prof. at Jena, and in 1802 accepted a similar position at Kiel. He became second president of the Court of Appeal at Bamberg (1814), and first president of the Court of Appeal at Ansbach (1817). His works include *Merkwürdige Kriminalrechts-fälle* (1808-11), *Betrachtungen über das Geschworenengericht* (1811), and *Kaspar Hauser* (1832). A collection of his *Kleine Schriften* was pub. in 1833. The *Leben und Wirken* were ed. by his son Ludwig (2 vols., 1852). See M. Grünhüt, *Anselm von Feuerbach und das Problem der strafrechtlichen Zurechnung*, 1922.

Feuillants, religious order in France, or reformed branch of the Cistercians, founded in 1577 by Jean de la Barrière, the abbot of a Cistercian monastery in Feuillant near Toulouse. The stricter rules laid down by La Barrière were ultimately confirmed by Pope Sixtus V., and a convent for the new congregation was founded in the Rue St. Honoré, Paris, by Henry III. During the Fr. Revolution the name of F. was given to some moderate Jacobins, including Lafayette, Sleyes, Barnave, Charles de Lameth and Barère, who met in the building in Paris formerly occupied by the religious order. The object of the club (founded 1791) was to unite the old monarchy with the new constitution. The old Jacobins became absolutely republican and contemptuously called the F. the 'Club Monarchique.' The club was dissolved in 1792.

Feuillet, Octave (1821-90), Fr. novelist and playwright, b. at Saint-Lô in La Manche. He was intended for a diplomatic career, and was for a while cut off by his father on declaring his resolution of adopting a literary career. He contributed to the *Revue Nouvelle* and *Revue des Deux Mondes*, but made his first definite success with his novel *Bellah* (1852), reprinted from the latter paper. This was followed by *La Petite Comtesse* and *Dalila* (1857), and *Le Roman d'un jeune homme pauvre* (1858). He also wrote many comedies, which had long runs, but have not retained their popularity. His best work in fiction was done during his later years, and include *Sibylle* (1862), his masterpiece; *Monsieur de Camors* (1867), *Julia de Trécaur* (1872) and *La Mort* (1886). He was elected to the Academy in 1862. See H. Bordeaux, *La Jeunesse de Feuillet* 1922.

Feuilleton (a diminutive of Fr. *feuille*, leaf of a book), supplement of a political newspaper devoted to literary and art criticism, gossip about the fashions, epigrams, and *bons mots*. It was not usually printed on separate paper, but divided from the political part of the newspaper by a line or by smaller print. It was first adopted in the *Journal des Débats* under the editorship of Bertin, and was so popular as treated by the Abbé Geoffroy that it became a permanent feature in Fr. journalism. The same kind of *causerie* may be found in Eng. papers, but the

name F. is used in England exclusively to denote an instalment of a serial story.

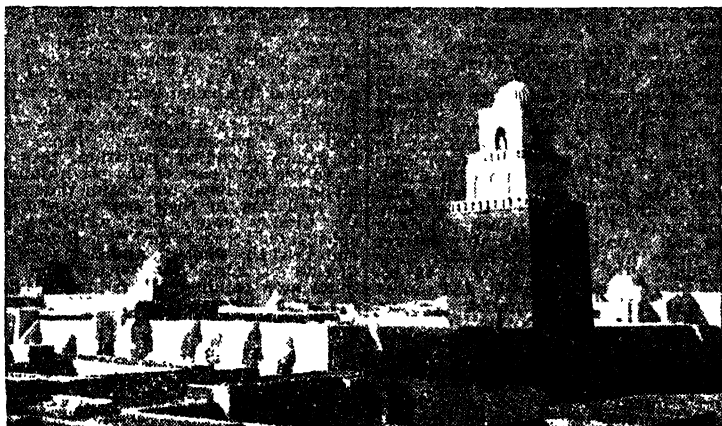
Fever (Lat. *febris*, from *fervere*, to burn), condition of the body characterised by a temp. above the normal, and accompanied by disturbances of normal functions. The feverish condition is symptomatic of a large number of diseases, but the term is particularly applied to those morbid conditions where high temp. is the predominating symptom; that is, where the rise of temp. is practically a measure of the severity of the disease. The normal temp. of the body is between 98° and 99°F. (about 37° C.); when the temp. is above 103° F. the febrile condition (*pyrexia*) is estab.; at 100° the condition is known as *hyperpyrexia*; if the temp. rises above 107°, a fatal termination to the disease may be expected. The cause of rise of temp. may be increase of heat-production owing to stimulated oxidation or a decrease in heat-elimination owing to disturbance of the functional activity of the heat-eliminating organs, notably the skin. The greater factor is probably the latter, as in cases of F. due to the action of micro-organisms it has been found that the increase of combustion due to the struggle between the white corpuscles and the bacteria does not produce much rise of temp. On the other hand, the destructive action of the bacteria and the consequent disintegration of protoplasm are accompanied by a proportionate disability of the cutaneous vessels to effect adequate elimination of heat. The febrile condition is usually ushered in by shivering and alternate phases of cold and heat. Although during the cold fits the skin is clammy and the patient complains of lack of heat, the internal temp. is usually as high as in the hot fits, the sensations felt by the patient being due to nervous disturbance. The pulse is generally rapid and weak, and the secretions are generally disturbed. The digestive secretions are abnormal, leading to loss of appetite and disturbed excretions. There is often constipation, unless diarrhoea is characteristic of the disease, as in dysentery, and the urine is scanty and loaded with sediment. The liver also fails in its functions, and the bile secretion is altered, if not suppressed. The general failure of the nutritive functions leads to wasting and feebleness, the nervous structures are modified and the patient may suffer from delirium. Diseases in which F. occurs may be classified as idiopathic F., where the rise of temp. is a predominating factor; and secondary F., where other symptoms predominate. The diseases more strictly called F. are usually associated with the presence of specific micro-organisms, and are generally infectious. Inflammation of certain organs and tissues is often accompanied by general F., and is called by that name as a secondary or popular title. Thus acute rheumatism is known as rheumatic F., meningitis as brain F. The treatment of F. is usually determined by the cause. As a temporary or soothing measure, the administration of such febrifuges as quinine, antipyrin, and antifebrin is useful, unless contra-indicated

by other symptoms. The application of cold in any form is often resorted to, particularly in the way of sponging, or the application of the cold pack, which consists of wrapping the patient in blankets wrung out of cold water. These measures must, however, be administered with care.

Fever, Breakbone, or Dandy, see DENGUE.

Feydeau, Ernest Aimé (1821-73), Fr. author, b. in Paris. His first pub. was a vol. of poetry, *Les Nationales* (1844), but he was far more successful in writing fiction, for which he showed a genuine talent. In *Fanny* (1858), *Sylvie* (1861),

largest in Africa and is used as a kind of univ. by over a thousand students. The mosque of Muley Edris, built nearly 1100 years ago by the reputed founder of F., is held to be so sacred that any approach by Christian or Jew is forbidden. The interior of the city is not so pleasing. The walls are decayed, and ruined buildings are to be seen on every hand. The streets are narrow and scarcely ever penetrated by the sun. Commercially, Fez is one of the busiest centres of N.W. Africa. The exports are olives, fruits, caraway seeds, citrons, honey, olive oil, hides and leather, tallow, ostrich feathers, ivory, gold, silk scarves, sashes, etc. The fez is also



FEZ: THE GREAT MOSQUE OF KARUEEN

Paul Popper

and *Le Roman d'une jeune Mariée* (1857) he depicts the corrupt manners of an immoral age. His other works include: *Du Luxe des Femmes, des Mœurs, de la Littérature et de la Vertu* (1866), *Histoire générale des usages funèbres et des sépultures des peuples anciens* (1857-61); and *L'Allemagne en 1871* (1872), a caricature of contemporary Ger. life.

Fez, or Faz, sacred city of Morocco, about 85 m. S. of the Mediterranean Sea, and 100 m. E. of the Atlantic Ocean; it is picturesquely situated in the valley of the Sebu, a stream which flows through the centre of the city and falls into the Atlantic 100 m. to the W.; the valley is shaped like a pear, and surrounded by orange groves, olive plantations and fruit orchards. The R. Wad-el-Jubor flows through the neighbourhood, and enters the Wad-el-Sebu, about 6 m. northward of the city. The former stream divides the tn. into two parts, the old part, Fas-el-bali, being on the r. b., and the modern Fas-el-djedid, on the l. b. Viewed from a distance, Fez has a strikingly handsome appearance, and is celebrated as a 'holy city' of Islam, and a seat of learning. The mosque of Karueen is said to be the

manufactured. There is a regular caravan trade with the interior cities of Africa. The native industries are morocco leather goods, pottery, and gold and silver ware. Fez was founded in 808 by Muley Edris, and it became the cap. of the W. African Muslim states. In the tenth century, pilgrimages were made to Fez, instead of to Mecca. It was incorporated with Morocco in 1548. In 1911 the city was besieged by hostile tribesmen, but relieved by the Fr. general Moinier. Pop. 144,200, mostly Moslems, together with some 9000 Jews, and 9500 Europeans, mostly Fr.

Fez, crimson skull-cap, forming the national head-dress of the Turks. It was so called, because the place of its sole manuf. was formerly Fez in Morocco. France, Germany, and Switzerland also make fezes now. They are brimless and are ornamented with a tassel on the centre of the crown. The dye used for them is obtained from small berries which grow in profusion in the neighbourhood of Fez.

Fezzan (anc. Phazania), country situated S. of Tripoli, N. Africa, and transferred to Italy, with the rest of Tripolitania under the treaty of Ouchy (Oct.

1912). It extends 390 m. from N. to S., and 420 m. from E. to W., and has an area of 156,000 sq. m. It consists of a desert, enclosing numerous oases, and bordered by low ranges of hills. The Jebel-es-Soda or Black Mts. and the Haruj-el-Aswad cross the country on the N. The climate is even and healthy on the whole, as it does not lie within the tropical rain zone; rain is not frequent. Water, however, is found plentifully near the surface of the ground. There are five grain harvests annually: wheat, barley, melons, turnips, and cotton are cultivated, while figs, dates, olives, almonds, henna, alfalfa, oranges, and grapes form the chief wealth of the country. Homs (or Khoms) has for ages been the depôt for the produce of the F. The prin. tns. are Murzuk, the cap. (pop. 10,000); and Sokna, Germa, Gatroun, Tejerri, etc. In the Second World War the F. was the theatre of a successful campaign organised by Gen. Leclerc, on the orders of Gen. de Gaulle, in 1941-42 and carried out in 1943. He took the oasis of Kufra in 1941 and, in 1942, made frequent raids into the F. from Fort Lamy in Chad. Having thus acquired a familiarity with all the conditions of terrain and climate, he concentrated at Fort Lamy and Faya forces and supplies considerably greater than those he had used in the raids throughout 1942. By Dec. 22 (1942) his troops had penetrated the F. and routed a motorised lt. detachment S.E. of Gatroun. Oum-el-Araneb was attacked on the 30th and fell on Jan. 4 (1943). El-Gatroun was taken on Jan. 6 and with the capture of Murzuk on the 12th the whole of the F. was conquered and Leclerc's forces went on to take Mizda, entered Tripoli (Jan. 25) and on the next day took Gadamès. This remarkable campaign involved a march of 2500 km. across formidable deserts, without re-victualling, and the scaling of the Tibesti Mts. some 3000 metres in height—altogether an exploit which in peace time would have been remarkable enough, but to have carried on the way bastions fortified for years by an enemy who disposed of motorised and armoured engines of warfare was a feat of arms which surpassed the boldest flights of imagination. (See Capt. Paul Moynet, *Les Campagnes du Fezzan*, 1943.) Pop. 32,000.

Ffestiniog (place of hastening), par. and tn. of Merionethshire, Wales, situated about 20 m. N.W. of Bala, and 8 m. from Portmadoc. It is the centre of a slate-quarrying dist. Pop. 9000.

F.F.I., abbreviation for Forces Françaises de l'Intérieur, Fr. resistance army in the Second World War. See FRANCE—History; and WESTERN FRONT IN SECOND WORLD WAR.

Fiacre, or **Fiacrach**, Saint (Celtic **Fiachra**), (d. c. A.D. 670), Irish anchorite, who was allowed by the bishop of Meaux (in France) to build a little monastery at Breuil. During life he was famed for his miracles, and after death they were long wrought near his shrine. In 1568 his remains were carried for safety to the cathedral of Meaux, where they still rest.

The Hôtel St. Fiacre of Paris, which was named after him, gave its name to a kind of cab (*fiacre*).

Fianna Fail (Soldiers of Destiny), name of the political party in the Irish Free State (later Eire) which followed Eamon de Valera (q.v.). It was returned to office some years after the end of the civil war of 1923, pledged to a policy embracing the abolition of the land annuities to Britain, protection, the abolition of the parl. oath of allegiance to the Crown, the abolition of the right of appeal to the Privy Council and the abolition of Partition. The 'treaty' arrangement whereby S. Ireland was accorded Dominion status was accepted by the moderates under Cosgrave (q.v.) but declined by de Valera and his republican followers, who, however, are not so extremist as the I.R.A., still less, of course, identical with that body. The F.F. party gov. at once proceeded to abolish everything constitutionally binding their ter. to the Brit. Empire and to embark on an economic policy of 'self-sufficiency.' There being no means of ending 'partition,' they had to shelve that part of the programme as an immediate issue, contenting themselves by declaring in their new Constitution that the Erse name 'Eire' which was now substituted by them for 'Irish Free State' embraced the whole is. and that the jurisdiction of Eire 'ran within the Free State area pending the re-integration of the national territory.' See further under DE VALERA; EIRE; IRELAND.

Fians, Anglicised form of *Fiann*, or *Feinne*, of which the Eng. 'Fenians' is a variation. It is rather uncertain exactly what the F. were: what is certain is that the name is derived from Finn MacCool, or Finn MacCumail, who is the central figure of the later heroic or Ossianic cycle of Irish legend. In Scotland Finn MacCool is called Fingal. Finn was a posthumous child, and was at first called Demni. He was the leader of the F., concerning whom the general opinion is that they were a kind of militia or standing army, which was drawn from all quarters of Ireland to assist in the repulsion of enemies, particularly those from over the sea. The headquarters of the F. was at Alton (Allen) in co. Kildare, where Finn himself usually resided with sev. contingents of his followers; the rest were posted at various places throughout the country. The adventures of the F. in war, love, and hunting are the subject of many tales and legends. The admission to this band of warriors was only gained after peculiar and trying ceremonies of initiation. Dr. Skene considers the F. to have been a distinct race, which preceded the Irish and Scottish Gaels and the Germanic people of 'Lochlan' (Scandinavia). The chief figures of the F. were Ossian, the son of Finn MacCumail, Oscar, the grandson, and Diarmait O'Duibne; the latter eloped with the destined bride of Finn, Granne, the daughter of Cormac MacArt (q.v.); the story of this is a well-known legend. The process whereby Finn became associated with the reign of Cormac MacArt is by

no means clear; by the year 1000 he was so associated and has been a popular hero for more than 800 years; primarily he is regarded as one with magical powers, and as a great poet. Finn can be shown to have been originally a figure in the traditions of Leinster and Munster previous to the Viking age; it is impossible that such a band as the F. existed in the second and third centuries, as a number of sages of much earlier date than those which state so have no mention of them. See W. F. Skene, *The Dean of Lismore's Book*, 1862, with introduction; J. F. Campbell, *Leabhar na Feinne*, 1872; J. G. Campbell, *The Franks*, 1891; D. MacRitchie, *Fians, Fairies and Picts*, 1893.

Fiasco (It. word meaning 'bottle') has long been used in connection with the It. stage to draw attention to faults in either singing or acting. Perhaps the modern sense of failure is a metaphorical transference from the bursting of a bottle. The word was early borrowed by other nations of Europe, and in this country it is used indifferently of any event which comes utterly to grief.

Fiat, decree, order, or warrant of a judge, or the attorney-general, or a secretary of State, ending with *fiat ut petitur*, i.e. let it be done as is asked. One of the commonest instances of its application was in the case of a petition of right for redress of an injury at the hands of the crown (*q.v.*); where a subject suffered such injury he could not sue the crown in the ordinary way, by reason of the maxim that the 'king can do no wrong'; he therefore presented a 'Petition of Right' to the home secretary setting out the facts and asking that right be done him in the matter. If the home secretary granted his F. the question was decided by proceedings not dissimilar to those of an ordinary action. By the Crown Proceedings Act, 1947, a subject can now sue the Crown by the ordinary procedure as between subject and subject.

Fiber Zibethicus, see MUSK-RAT.

Fibre and Fibrous Substances (from Lat. *fibra*), slender filaments which compose other bodies, which may be either animal, vegetable, or mineral, and are utilised in manufs. Those used in the arts are either of animal or vegetable origin, with the exception of asbestos, which is mineral. An animal F. of great importance is that of the camel, which is made into excellent cloth, while the hair of the cow makes an inferior woollen cloth. A F. of a silky quality is derived from the byssus of a large shell-fish found in the Mediterranean, and which is used for the making of shawls and gloves. The dicotyledonous plants yield the most important textile F. of vegetable origin, of which flax, hemp, reed, and jute are good examples. The most valuable is the cotton plant, consisting of hairs all round its seeds. Coir F. is obtained from the husk of the nut of the coconut palm.

Fibrin, protein derived from blood. It is thought that it arises from the action of a ferment upon fibrinogen. F. is only a constituent of blood after it has left the

arteries, being formed during the process of coagulation or clotting. Analysis reveals that in 100 parts there are 52.6 parts of carbon, 21.8 oxygen, 17.4 nitrogen, 7 hydrogen, and 1.2 sulphur. It reacts like other proteids, is insoluble in water, highly elastic, tough, and jelly-like. If the blood-plasma of the horse is heated to 55° C., a purer F. is obtained than by beating a blood-clot with twigs. In this latter case globulin and hemoglobin are mixed with the F. which adheres to the wood.

Fibroline, yarn made from flax, jute, and hemp waste. It is used with linen or cotton yarn for the backs of carpets and similar purposes.

Fibula, the splint-bone of the leg, being situated behind the 'tibia,' and extending from the knee to the ankle. It is composed of a slender four-sided shaft and two larger extremities. Ligaments fastened to a roughened surface bind this bone to the tibia. The projecting ankle is formed by the 'external malleolus,' which is a downward projection of the lower end. This extremity articulates with the astragalus, and the upper or head with the upper portion of the tibia. The bone at the back of the astragalus, known as 'os trigonum,' is the lower of the two pressure epiphyses.

Fibula (Lat. word from *figere*, to fasten), a clasp, buckle, or brooch. Fibule or



ANGLO-SAXON FIBULA

Silver set with garnets

safety-pin brooches were known to the Mycenaean age, which is pre-Homeric.

Fichte, Immanuel Hermann von (1797-1879), Ger. philosopher, b. at Jena, lectured on philosophy at the univ. of Bonn from 1836 to 1842, and afterwards was appointed to a chair in Tübingen. In his *System der Ethik* (1850-53) and his *Psychologie* (1864-73) etc., he tries to reconcile Herbert and Hegel. Disliking the pantheism of the latter, he was drawn rather towards the theism of Leibnitz, and strove to realise philosophically the personality of God. See Hildegard Hermann von Fichte's, 1928.

Fichte, Johann Gottlieb (1762-1814), Ger. philosopher of Swedish descent, b. at Rammenau, Upper Lusatia. His early precocity aroused the interest of a local dignitary, Baron von Miltitz, who gave him an excellent education; and after passing through Pforta, where he read Lessing and Goethe, he entered Jena Univ. to study theology. He was now

self-dependent, and the next few years found him occupied in private teaching and writing. In 1788 he became a tutor at Zurich, but this relief was short-lived, and settling at Leipzig he was compelled to turn again to literary hackwork for a livelihood. About this time he first studied Kant—an important event in his mental development, which thoroughly reversed the fatalistic tendencies shown in his early *Aphorisms on Religion* (1790), the result of reading Wolff and Spinoza at Jena. He even commenced a 'popular version' of Kant's *Critique*, but this was left unfinished. Shortly after this, he made Kant's personal acquaintance and submitted a treatise, *A Critique of Revelation*, which Kant approved so highly that he secured its pub. in 1792; and F. was at once acclaimed as a significant philosophical force. This success enabled him, in 1793, to marry Johanna Maria Rahn, to whom he had become engaged at Zurich three or four years before; and for the next few months he remained in Switzerland, studying and developing Kantian ideas and principles. In 1794 he secured the chair of philosophy at Jena, and won immediate recognition and renown for his brilliant lectures. These early lectures formed the nucleus of the Fichtean system, and in the same year he pub. three vols. on the *Theory of Knowledge*. His practical philosophy was given in the *Foundation of the Laws of Nature* (1796), and the *System of Moral Philosophy* (1798), his most important work. Meanwhile, from 1795-98 he had been joint editor of the *Philosophical Journal*, and had incidentally become the friend of Goethe, Schiller, Schelling, the Schlegels, Tieck, and Novalis. But in 1798 trouble arose through a paper pub. in that jour., and the following year F. had to resign from Jena, charged with atheism and disowned by Kant. The rest of his life was mostly passed in Berlin with the Schlegels and Schleiermacher; the chief literary results being the *Vocation of Man* (1800), the *Exclusive Commercial State* (a socialistic thesis, 1800), and *The Way to a Blessed Life* (1806). In 1810 he was appointed rector at the new Berlin Univ.

With the exception of his lectures on transcendental logic (1812), none of his subsequent work covers any important fresh ground; but during the struggle for national independence he earned some distinction as a patriotic lecturer (1813). F.'s philosophy, known as subjective idealism, aimed at a complete exposition of the fundamental laws and principles which govern cognition. He contends that subject and object are absolutely identical and that the individual ego, the human mind, is non-existent apart from the absolute ego, the divine and infinite spirit of all things, God. 'Knowledge is not merely knowledge of itself, but of being, and of the One Being, God, that really is.' All realities, animate, and inanimate, are but sensuous phenomena, material expressions of their essential divine idea, and they have no separate existence, but are the product of the human soul, divinely inspired. The

majority of men live in relation to the superficial appearances of things, ignorant of their divine essence; it is for the philosopher and the man of letters to discover and interpret the fundamental spiritual ideas, of which the appearance is merely a vesture. F.'s influence on philosophy and literature has been enormous; Hegelian idealism and Emersonian transcendentalism are considerably indebted to him, both for idea and for idiom of expression, whilst Schopenhauer's writings are almost wholly evolved from F.'s later works. Besides his more esoteric philosophical works, he wrote sev. of a popular cast, including *The Nature of the Scholar* and *The Characteristics of the Present Age*. He fell a victim to the War of Independence, dying of fever caught through his wife and her nursing of wounded patients in the hospitals. His collected works were pub. by his son I. H. F. (1845-48). See M. Weber, *Fichte's Socialism and sein Verhältnis zur Marx'schen Doktrin*, 1900; G. H. Turnbull, *The Educational Theory of Fichte*, 1926; and life by E. Bergmann, 1928. See also HEGEL; IDEALISM.

Fichtelgebirge (pine mountains), a mt. system of Bavaria, Germany; it forms the nucleus of three mt. ranges, the Erzgebirge, Frankenwald, and Böhmerwald. The highest summits are the Schneeberg, 3161 ft., and the Ochsenkopf, 3334 ft. The mts. were once covered with pines. The geological formation is chiefly granite, slate, gneiss, and basalt; the minerals obtained are iron, sulphur, lead, and copper. Marble and stone are quarried, and the inhab. are engaged in charcoal burning, forges, and blast furnaces. There are extensive tracts of forest land. Alexanderstad is a noted holiday resort.

Ficino, Marsilio (1433-99), It. philosopher, was a true son of the Renaissance. Fortunate in the patronage of Cosimo de' Medici, he secured, in 1463, the presidency of a Florentine college. F. fanned the awakening interest in Gk. philosophy by his trans. of Plato, and unlike the scholars of the succeeding generation was first a Christian and afterwards a Platonist. The incomplete fusion of ecclesiastical doctrine and pagan thought gave a curious flavour to his sermons, when in 1473 he entered the Church.

Ficksburg, tn. of S. Africa, in the Orange Free State, near the Caledon R. In the vicinity are diamond mines and petroleum wells. Petrified fish are found in the fossilised ooze of the Wonderkop. Pop. 3000.

Flouon, Legal, some fact, state of things, or proposition assumed to be true by the law avowedly for the purposes of justice or convenience. Fs. in law though often ridiculous enough, have generally had their origin in some defect in the existing laws or course of procedure, and have in a measure exemplified the desire of judges or other interpreters of law to make the law, in particular cases where some change was necessary, conform to the general and progressive opinion of society. Many Fs. have, far from being

injurious, been highly beneficial, and have paved the way to legislative remedy. Social necessities, says Sir H. S. Maine (*Antient Law*), and social opinion are always in advance of law. Law is static, most societies progressive, and Maine thinks that legal F's. were historically the first agency by which law was brought into harmony with society. But in this sense of the relation of F. to the evolution of law, Maine uses the term to signify any assumption which conceals or affects to conceal the fact that a rule of law has undergone alteration, its letter remaining unchanged, its operation being modified. In this wider signification the term embraces not only F's. in Eng. law, and Rom. law, but the whole of Eng. case-law (Bentham's 'judge-made law'), and the Rom. *responsa prudentum* (answers or opinions of jurists of repute) as resting on a fictitious basis. It is a jurisprudential commonplace that the law is constantly and more or less imperceptibly changed by judicial decisions, although all decisions profess to do no more than apply settled principles to new facts; and similarly with the authoritative answers of the anct. Rom. juriconsults. A good instance of the utility of a legal F. in Rom. law was that of adoption which overcame the narrow caste nature of a legal *familia*, by permitting the family tie to be artificially created by adoption or arrogation. Some instances of F's. in Eng. law are: the proposition that husband and wife are one; the assumptions in such anct. writs as those of *quo minus* by which the Court of Exchequer (q.v.) obtained its common law jurisdiction, and *vi et armis* by which the King's Bench court usurped much of its jurisdiction (see KING'S BENCH DIVISION); the suppositions involved in *fines* and *recoveries* (q.v.); and the assumption of the existence of the two legendary and much ridiculed litigants 'John Doe' and 'Richard Roe,' with the object of applying the real process of an action of ejectment to the trial of questions relating to title to land.

Ficus, genus of Moraceæ, chiefly indigenous to tropical forests, and containing species with widely diverse characteristics. *F. carica*, the fig-tree of commerce, a native of Asia Minor and Syria, is now found in a wild state in the countries bordering on the Mediterranean. The fruit of the wild variety has not the succulence of the cultivated kinds. *F. elastica* is the India-rubber tree, and is frequently cultivated in small pots; *F. religiosa*, the peepul, or sacred tree of the Brahmans and Buddhists, yields a gum resembling caoutchouc; *F. indica*, also called *F. bengalensis*, is the banyan, and yields an inferior rubber, the bark and roots also furnishing a coarse rope-fibre.

Fidææ, anct. tn. of Italy, situated on the Tiber, 6 m. from Rome. In the reign of Tiberius a gladiatorial show took place here, during which the amphitheatre collapsed and destroyed nearly 50,000 people. No ruins of F. now exist, but it is identified with the modern Costello Giubileo.

Fiddle, see VIOLIN.

Fidel-commissum, in civil law (q.v.), denotes a trust. Scots legal writers generally refer the origin of their law of trusts and trustees to the Rom. conception of a F. In Rom. law a F. was an informal bequest or devise made to the heir or legatee (who in such a case was called the *fiduciarius*), with a request attached to it that the *fiduciarius* or trustee should deliver the property to some named person who was incapable of taking directly under the will (the *fidel-commissarius* or beneficiary). At first the rights of the beneficiary were unenforceable and could only be made good by entreaty. The Emperor Augustus, supported by the propaganda of literature and probably under the inspiration of a revival of religion to supplant secret foreign rites, estab. a system which made *fidel-commissa* obligatory on the trustee, and appointed a special magistrate, the *prætor fidel-commissarius*, to compel the trustee to carry out his obligations. For the most part *fidel-commissa* were created by means of codicils (q.v.). Eng. legal historians, generally, are of the opinion that the lord chancellors (q.v.) borrowed the doctrine of the Eng. use (see USES) from the Rom. law of trusts.

Fidel Defensor (Lat. for 'Defender of the Faith'), title conferred upon Henry VIII. by Pope Leo X. in gratitude for a pamphlet in which that sovereign had roundly abused the heretic, Martin Luther. It was granted in 1521, and was subsequently confirmed by parliament and accorded to every Eng. king.

Fidelity Guarantee, form of insurance for the benefit of employers, by which they are guaranteed against fraud, etc., of their employees. The rate of insurance varies, being sometimes 5s. per cent and sometimes 40s. Generally, all the employees of a firm are guaranteed under one policy, and length of service, position, etc., are taken into consideration in fixing the premiums. The F. G. companies are: The Bankers' Guarantee and Trust, General Accident Guarantee Society, Law Accident, Ocean Accident, Provident Clerks' Guarantee and Accident, etc.

Fidenza (anct. Fidentia), walled tn. in the prov. of Parma, Italy, situated on the Stura, a trib. of the Po, 15 m. W. of Parma. It has fine cathed. al built in the fifteenth century in the Lombard style. Hemp and silk-spinning are carried on, and also glass manuf. It was the scene of the martyrdom of St. Doninus in 304, whence its former name, Borgo San Doninus. During the Hohenstaufen dynasty it became an imperial possession, and in 1501 the seat of a bishop. The Canonica of the cathedral suffered serious damage in the Second World War. Pop. 16,000.

Fides, goddess of anct. Rome, the personification of fidelity. Numa Pompilius is said to have instituted the festival of F., and to have built a temple to her on the Capitol. She was represented as a matron wearing a wreath of olive or laurel leaves, and carrying in her hand a basket of fruit.

Fiduciary Issue. In banking language, a fiduciary issue is that part of an issue

of bank notes that is not backed by gold actually held by the bank. As the word fiduciary implies, it is an issue made on the 'faith' of people in the reputation of the bank. In this sense all bills of exchange, cheques, and promissory notes are 'fiduciary' in so far as the assets behind them are undisclosed. From the time when the Bank of England lent its original cap. to the nation, thus commencing the National Debt, the extent of its fiduciary issue has been regulated by the gov.

Fief, or **Fee Law**, first meant an estate held in trust, on condition that the person holding it rendered personal or other service to the lord who granted it. There were three varieties of tenure, free, base, and religious. The first consisted in following the lord of the land to battle; the second were held in virtue of those services which more menial vassals did for their immediate superiors; and the last were held by virtue of masses said by the priests to whom the land was granted. See **ENTAIL** and **FEUDALISM**.

Field, term in heraldry for the ground, which is of a special colour, on which armorial bearings are displayed. See **HERALDRY**.

Field, The, 'the country gentleman's newspaper,' ranks first in the list of sporting papers. It was started about 1843, and was one of the many with which Bradbury and Evans were connected, both as printers and proprietors. Its earliest editor was Mark Lemon, and Leech supplied illustrations of hunting adventure. One of its owners was Benjamin Webster, the actor, who in time acquired the whole property and sold it to Serjeant Cox.

Field, **Cyrus West** (1819-92), founder of the Atlantic cable, b. at Stockbridge, Massachusetts. At fifteen he was a clerk in the store of A. T. Stewart & Co., New York, and in 1840 started a paper business for himself at Westfield, in which he was so successful that he was able to retire in 1853. He then began to think about a trans-Atlantic telegraphic cable, and having enlisted the sympathy of Peter Cooper and other Amer. capitalists, organised the New York, Newfoundland, and London Telegraph Company in 1854, and the Atlantic Company in 1856. The cable was completed by 1858 and was hailed with delight, but it was not in proper working order until 1866. He also interested himself in the New York Elevated Railroad.

Field, **David Dudley** (1805-94), Amer. lawyer, b. in Haddam, Connecticut. He took his degree at Williams College in 1825, and was admitted to the Bar in 1828. After a special study of England's legal system he worked throughout his life for the codification of the common law and procedure of America. His pamphlet on the reorganisation of the judiciary led to his appointment as chairman of a State Commission for the revision of practice and procedure, and the resultant civil code (1857) was adopted in 24 States and the criminal in 18; while the civil code of procedure was adopted in England—though

not until 1873. He became head of a State Commission in 1857 for the ambitious plan of reducing the whole *corpus juris* of the State into a written systematic code; but the codification was only adopted in small part, though it has often served as a model for Amer. codes. His pub. were *The Reorganisation of the Judiciary* (1846) and *Draft Outlines of an International Code* (1872).

Field, **Eugene** (1850-95), Amer. journalist and poet, b. at St. Louis, Missouri. He studied at Williams and Knox Colleges, and the univ. of Missouri. He wrote for various papers, but made his reputation when he became connected with the *Chicago News* in 1883. He is, however, chiefly known by his poems of childhood, of which *Little Boy Blue* is, perhaps, the general favourite. His prin. works are *A Little Book of Western Verse* (1889), *A Second Book of Verse and With Trumpet and Drum* (1892), and *Love Songs of Childhood* (1894).

Field, **Frederick** (1801-85), Eng. divine, b. in London, and was a direct descendant of Oliver Cromwell, of which he was very proud. He was educated at Christ's Hospital and Trinity College, Cambridge, and became a fellow of his college in 1824. In 1839 he ed. Chrysostom's *Homilies on St. Matthew*, and in 1842 he was presented by his college to the rectory of Reepham, in Norfolk. It was here he edited Chrysostom's *Homilies on St. Paul's Epistles* between 1849 and 1862. In 1863 he resigned his living and devoted his time to Origen's *Hexapla*, which was pub. in 1874.

Field, **Sir Frederick Laurence** (b. 1871). Eng. admiral. He was in charge of the torpedo and signal schools of Portsmouth. Flag-captain of H.M.S. *King George V.* and Director of Torpedoes during the First World War. Commodore and Chief of Staff to Admiral Madden. Third Sea Lord, 1920-23. Deputy Chief of the Naval Staff, 1925-27. First Sea Lord and Chief of the Naval Staff in succession to Sir Charles Madden.

Field, **Nathanial** (1587-1633), Eng. actor and dramatist, b. in Cripplegate, London. In 1600 he acted in Ben Jonson's *Cynthia Revels*, in 1601 in the *Poetaster*, and in 1606 played the title rôle in Chapman's *Bussy d'Ambois*. He was the author of two plays: *A Woman is a Weather-cock* (1612), and *Amerinds for Ladies* (1618), which retracts the charge. It is conjectured that he also collaborated with Massinger in the *Fatal Dowry*, and that he had a share in the writing of some of Beaumont and Fletcher's plays. See R. F. Brinkley, *Nathan Field, the Actor-Playwright*, 1928.

Field Research, see **ARCHAEOLOGY**.

Field, **William Ventrils**, first Baron Field of Bakenham (1813-1907), of Bakenham, Eng. judge. From 1830 to 1840, member of a firm of solicitors. Then entered the Inner Temple. Called to the Bar 1850. Took silk, 1864; was made Bench, 1865. In Feb. 1875, appointed judge of the Queen's Bench. On Supreme Court rules coming into force in 1883, F. was appointed by the lord chancellor to sit in chambers continuously for nearly a

year, to estab. a uniform practice. Decided some very important cases—notably *Sharp v. Wakefield*, which laid down the principle of unfettered magisterial discretion in renewal of drink-licences. Resigned, 1890; and on April 10 was raised to the peerage. Thereafter acted as judge in House of Lords and Privy Council.

Field Artillery, see ARTILLERY.

Fielden, John (1784–1849), Eng. politician, b. at Todmorden, Lancashire. As a boy he worked in his father's factory, and in after years remembered the exhaustion caused by his daily toil, and was a keen supporter of the Ten Hours Bill which became law in 1847. He also took an active part in the agitation for parl. reform, and was, like Cobbett, very much against paper money. He pub. *The Mischiefs and Iniquities of Paper Money* (1832), *The Curse of the Factory System* (1836), *A Selection of Facts and Arguments in favour of the Ten Hours Bill* (1845).

Fieldfare, or *Turdus pilaris*, belonging to Turdidae, the thrush family, is a familiar winter visitor to the Brit. Isles and Central Europe. It is gregarious in habit, and finds its summer home in the birch forests of Norway, Sweden, and Russia. The nest of the F. is of long fine grass with an intervening layer of mud; it may be built in birch or fir trees at an elevation of 15 ft., and has occasionally been seen quite near to the ground. This bird feeds on berries in hard weather, but also travels in flocks over the fields in search of slugs and other animal food. The plumage varies from ashy-grey to chestnut-brown, the underparts being a rich ochre, spotted with black.

Field-glass, instrument used for viewing objects at a distance, composed of two telescopes, which are identical in construction, placed parallel to one another. It is easy to use and does not strain the eyes like some telescopes, indeed it has the advantage over that instrument in that it allows the use of both eyes. It is of great value to travellers, soldiers, and sailors, and is almost universally employed by the Navy in place of the long telescope used in Nelson's time. There are two kinds of Fs., the Galilean type and the prismatic. The Galilean, which is the ordinary F., consists of two lenses, an object-lens and an eye-lens, the object-lens is convex, and the eye-lens concave. It was Porro, an It. engineer, who discovered that the usual reversing lenses in a telescope could be replaced by a combination of prisms, but these could not be used until a suitable medium was found, owing to the great absorption of light. The prismatic F. was introduced in 1898, and is now in general use. Of this there are sev. varieties, the special one used by the field naturalists has extending arms which place the object glasses above the head, thus enabling the person using them to keep out of sight; the object lenses, too, can be placed at any angle. The modern glass is made of magnalium with mountings of horn for the eye-pieces, and each eye-piece can be adjusted to suit each eye, and there must

be two prisms in each tube. It is made in four different powers, magnifying three, six, or twelve diameters. The first is used for objects at a short distance, while the last, which does not cover such an area of view, is of great service to soldiers and naturalists.

Fielding, Anthony Vandyke Copley (1787–1855), Eng. water-colour landscape painter, was the pupil of John Varley. In 1810 he became an associate of the Water-Colour Society and contributed largely to its exhibitions. In 1813 he was a full member, and was made president in 1831. His works are clever but slight, his best pictures being sea-pieces and aerial effects. There is a collection of his drawings in the Victoria and Albert Museum, S. Kensington, London.

Fielding, Henry (1707–54), Eng. novelist, b. at Sharpham Park in Somerset. Son of Gen. Edmund F. and a cousin of



HENRY FIELDING

Lady Mary Wortley Montagu. He was educated at Motcombe and Eton, and also studied for a short time at Leyden, where he graduated in 1728. He returned to London in 1728 and for some years led a dissipated life and began a long dramatic career by the pub. of *Love in Several Masques*, which was played at Drury Lane. Several comedies and farces followed, and his burlesque, *Tom Thumb* (1730), is said to have evoked a laugh from Swift, who only laughed twice in his life. In 1735 F. married Charlotte Bradock and bought the little Fr. theatre in the Haymarket, where he produced *Pasquin* (1736) and *The Historical Register* (1737), but the Licensing Act of 1737 put an end to his dramatic labours. All his comedies and farces have long been lost in oblivion. After a brief experience as a theatre lessee, studied law at the Middle Temple and was called to the Bar. Literature, however, was his main preoccupation, and in

1742 he came to the front with *The History of the Adventures of Joseph Andrews and of his friend Mr. Abraham Adams*. This was a parody on Richardson's *Pamela*, and was prompted probably by a feeling of reaction against the morbid tendencies of Richardson's work. The chief character in the book is Parson Adams, who is a 'noble example of primitive goodness and childlike Christian altruism,' and is perhaps F.'s finest and most original conception. In 1743 appeared three vols. of his *Miscellanies*, the third of which contained his strange *History of the Life of the late Mr. Jonathan Wild the Great*, a satirical work which places F. second to Swift in ironic power. After his wife's death he turned again to the law, but in 1745 he was once more engaged in literature as editor of the *True Patriot* and afterwards of *The Jacobite's Journal*. In 1749 his greatest novel, *The History of Tom Jones*, appeared; this was popular from the very first, and was praised by Hazlitt and Coleridge, and by Byron, who calls its author 'our prose Homer.' In 1752 *Amelia* was pub.; the plot of this is inferior to that of *Tom Jones*; but the descriptions and characters are very fine. He founded, conducted, and was the chief contributor to the *Covent-Garden Journal* (1752). Journalism and his duties as a justice of the peace occupied much of his time from 1750-54, when ill-health forced him to go abroad to Lisbon, where he died and was buried. After his death his *Journal of a Voyage to Lisbon* was pub. (1755). Scott styles him 'the father of the English novel,' and one Fr. critic describes *Tom Jones* as 'le premier roman du monde.' In both *Joseph Andrews* and *Tom Jones* F. outlined his ideas on the proper constitution of the novel, pruned of mere didacticism, but informed with a critical spirit and built on a philosophy of life. He conceives the novel as a type of epic, which, like drama, may be either tragic or comic. In associating his comic novel, *Joseph Andrews*, with the epic, it is evident that he was thinking more of the narrative form than the content of epic. There is a less remote analogy between his most typical novel, *Tom Jones*, and drama, not only in structure but in the new prominence given to dialogue—a prominence which was destined to have a most marked influence on the development of the Eng. novel. Again, F.'s realism, unlike that of Defoe, who employs it to give readers the illusion of recorded facts, has for its object to convey rather a general impression of life. Unlike the novels of Richardson there are no emotional crises in the novels of F. Yet in the hist. of the evolution of the modern novel the names of F. and Richardson are inseparable. Both his and Richardson's novels differ not only from those of Defoe (who shares with both the title of 'father of the English novel') but from those of all their predecessors in one essential feature in particular, which is best expressed in F.'s own words: 'It hath been thought a vast commendation of a painter to say his figures seem to breathe; but surely it is a much greater and nobler applause, that they appear to think'—

words which almost seem to herald the coming of the psychological novel. If to Richardson we owe the note of sentiment, dashing and versatile F. may claim to have imported the note of humour. In analytical force and subtlety F. may be inferior to his contemporary but his was the fresher and more vigorous mind. He attempted to paint a true picture of human life as he saw it, and in reproducing the broad features of tn. and country life in the mid-eighteenth century, he is unsurpassed. The complete works were ed. by W. E. Henley and Akers (1903). See Sir W. Scott, *Lives of the Novelists*, 1825; A. Dobson, *Fielding*, 1883, 1925; G. M. Godden, *Henry Fielding: a Memoir*, 1910; H. K. Banerji, *Henry Fielding, Playwright, Journalist, and Master of the Art of Fiction*, 1930; B. M. Jones, *Henry Fielding: Novelist and Magistrate*, 1933; M. P. Willcocks, *A True-Born Englishman*, 1948; Elizabeth Jenkins, *Fielding*, 1948.

Fielding, William Stevens (1848-1929), Canadian statesman, originally a journalist, b. in Halifax, Nova Scotia; He was for twenty years connected with the *Halifax Morning Chronicle*. He resigned his position of managing editor of that paper to engage in the active duties of public life, and rose to be Prime Minister in 1881. In 1896 he resigned and was appointed Minister of Finance in the cabinet of Sir Wilfrid Laurier. In this capacity he was charged with the readjustment of the Canadian tariff. He was a member of the Brit. Royal Commission on trade between Canada and the W. Indies, 1909-10, a governor of Dalhousie Univ. and Canadian delegate to League of Nations Assembly, 1922. P.C., 1923.

Field-marshal, the highest rank in the Brit. Army, was introduced by King George II. in 1736, although the title 'marshal' was in existence much earlier, for Matthew Paris says that in 1214 King John constituted Wm., earl of Salisbury 'marescalcus' of his forces. The 'marescalcus camp' was originally one of a number of officials to whom the name of marshal was given. The marshal was responsible for order in court and camp, and on military expeditions it was the custom for two marshals to precede the army to select a site for the camp, and in time of peace they arranged for the king's lodging.

Field-mouse, name given to sev. species of rodents, which are allied to the ordinary mouse, the vole (q.v.), etc. *Mus sylvaticus*, the wood-mouse, is a great pest in fields and gardens, and boards large quantities of grain; *Mus. minutus*, the smallest of Brit. mammals, makes a curious globular nest among reeds and grasses.

Field-officers, in the army, are those which rank above a captain, but below a general, viz. majors, lieutenant-colonels, and colonels. The captains, lieutenants, and sub-lieutenants are called company officers. See OFFICERS.

Field of the Cloth of Gold was the name given to the place between Guines and Andres where King Henry VIII. met

Francis I. in 1520. Henry meant to make a great impression in Europe, and spared no pains to make the scene as magnificent as possible. He succeeded in his purpose, but the meeting was of little avail politically.

Fields, Gracie (b. 1898), Eng. variety actress, b. at Rochdale, Lancs. Real name Grace Stansfield. She joined a troupe when only seven years of age, went into a cotton mill, and began as a vocalist in a Rochdale cinema, 1906. First London appearance, 1916, at the old Middlesex Music Hall in a revue *Yes, I Think So*, brought from Manchester. A revue *It's a Bargain* with Archie Pitt (whom she married in 1923), ran for nearly three years. Their next revue *Mr. Tower of London*, ran for seven years. Appeared with Sir Gerald du Maurier in *SOS*. Has won great popularity, both through her burlesques and her private generosity.

Field Spaniel, see *under* SPANIEL.

Field Sports, see *TRACK AND FIELD SPORTS*.

Fierabras, name of a prose romance which was very popular in the fifteenth and sixteenth centuries. It was taken from a 'chanson de geste' relating to the Emir Balan, who was conquered by Charlemagne.

Fieri facias, see *EXECUTION*.

Fiery Cross, an anct. summons to arms which was used in Scotland and sent by messengers from place to place. The token was made of wood, generally in the form of a cross, which was first set on fire and then dipped in the blood of a goat. It was employed by the Highland chiefs on special occasions, especially in time of war, to summon the clan as quickly as possible. Roderick Dhu, in Scott's *Lady of the Lake*, used the F. C. to summon his clan to battle.

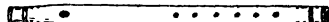
Fieschi (or **Fiesco**), **Giovanni Luigi**, Count of Lavagna (c. 1523-47), Genoese nobleman who opposed the Republican gov. which Andrea Doria had restored. He formed a plot to establish an oligarchy, and was encouraged by Pope Paul III., the Duke of Parma, Francis I. of France, as well as by his brothers in Genoa. His object was to seize the fleet and hold the gates of the city. This was successfully accomplished, and Andrea put to flight when it was discovered that F. was missing. He had accidentally fallen into the water and was drowned. See *DORIA*, *ANDREA*.

Fieschi, Giuseppe Marco (1790-1836), conspirator, b. at Murato, Corsica. He served as a soldier in Russia in 1812. In 1830 he obtained a gov. appointment, but was dismissed for fraud. He then began to prepare an 'infernal machine' to revenge himself on society. When this was ready he hid it in his lodgings in the Boulevard du Temple, Paris, and when Louis Philippe was passing along to the Bastille exploded it. Louis escaped unhurt, but sev. others were injured, and amongst them F. himself. His life, however, was saved for the stroke of justice, and he was executed with his accomplices Mory and Pèpin.

Fiesco, Sinnibaldo, see *INNOCENT IV.*

Fiesole, small tn. in the prov. of Florence, Italy, and 4 m. from the city of Florence. It is of great historic interest, and contains Etruscan and Rom. remains. It was the anct. *Fesula*, and from 63-62 B.C. was the headquarters of Catiline. There is a well-preserved Rom. theatre, with stairways and entrance arches. The chief building is the cathedral, commenced in 1028. The episcopal palace and the palazzo del pretorio, or tn. hall, date from the thirteenth century. Its decay began in the Middle Ages with the rise of Florence, and it has now only about 3000 inhab., whose chief occupation is straw-plaiting. In the Second World War the church of S. Alessandro was the only monumental building to suffer serious damage, which was sustained by the roof and the apse. Pop. 11,400.

Fiesole, Giovannina, see *ANGELICO, FRA.*
Fife, musical instrument similar to a flute, but which generally has only one key. It has a compass of about two octaves, and is usually pitched in B_♭.



FIFE

or C. Only simple melodies can be executed on it, and it is generally played with the drum. The army drum and fife bands are still popular. See *FLAGEOLET*, *PICCOLO*, *FLUTE*.

Fife, maritime co. of Scotland, forming a peninsula on its E. coast, between the firth of Tay and the firth of Forth. The K. Eden flows through the length of the co. into St. Andrews's Bay, and its highest hills are E. Lomond, 1471 ft., and W. Lomond, 1713 ft. The agric. of the co. is in an advanced state, and there are valuable coal mines at Dysart, W. Wemyss, Leven, Markinch, Dunfermline, Kilty, Lochgelly, Cowdenbeath, and Kirkcaldy; limestone, sandstone, ironstone, and shale are also worked. The chief manuf. is linen, which is carried on chiefly at Kirkcaldy and Dunfermline, but Kirkcaldy is also famous for its olecloth and linoleum. The co. is also noted for its breweries and tanneries as well as for its iron foundries and engineering works; shipbuilding, too, is extensively carried on, and most of the coast tns. take part in fishing. The chief tns. are Cupar, the co. tn. Dunfermline, St. Andrews, Kirkcaldy, etc. For purposes of gov. the co. is divided into two divs., E. Fife and W. Fife, both of which send a member to parliament. Area 504 sq. m. Pop. 278,000.

Fife, Alexander William George Duff, Duke of (1849-1912), son-in-law of King Edward VII. and Queen Alexandra, descended from Alexander Duff of Keithmore, who was b. in 1624. From 1874-79 he represented Elgin and Nairnshire in Parliament, and from 1908 was president of the County of London Territorial Force Association. He succeeded his father as sixth earl of Fife in 1879, and was created duke of Fife in 1889 on his marriage to the Princess Royal, Princess Louise Victoria

Alexandra Dagmar, eldest daughter of the late King Edward VII. He had two daughters: Princess Alexandra, now duchess of Fife in her own right, to whom Queen Victoria stood sponsor, born in 1891; and Princess Maud, countess of Southesk, Queen Alexandra's god-child. On Dec. 13, 1911, he was wrecked in the *Delhi* off the Moroccan coast and rescued only with difficulty. He appears to have caught a chill and died at Assuan, Jan. 29. His body was brought to England and interred at Mar Lodge, Braemar, the seat of the Fife family.

Fifth Column, term that had its origin in the Sp. Civil war, being credited to the Nationalist general, Mola, who said, when he was beleaguering Madrid: 'I have four columns operating against Madrid and a fifth inside composed of my sympathisers.' When the city eventually fell to Franco in the spring of 1939, the Nationalist forces received full co-operation from his supporters within the city. The Gers., in the invasion of Poland, Norway, and the Low Countries (1939-40), had elaborated the use of F. C. activity into an essential part of the technique of invasion. By long and insidious efforts they had weaned elements of these countries to the Nazi political faith and Nazis of Ger. descent had obtained various apparently orthodox posts in the ters. of their intended victims, so that, when the actual invasion was launched, the campaign was already half-won. Thus it is evident that the term may connote, as in the case of the Sp. Civil war, a mere supporter of one particular faction of his own fellow-countrymen, whereas, in the evolution of the Ger. technique, it meant nothing less than a traitor or spy. One of the most infamous traitors in the Second World War, was Vidkun Quisling, the Norwegian betrayer of Oslo, whose name rapidly became a synonym for a fifth columnist in its worst connotation. Quisling was leader of the small Nazi 'party of National Concentration' and was Norwegian Minister of Defence in 1932, but was forced to resign owing to a private scandal. Under this traitor the Ger. invaders set up a puppet gov. after he had thrown open the gates of the cap. to them. During the invasion of the Low Countries in May 1940, the Dutch were betrayed at The Hague by Ger. civilians resident in Holland, who opened fire on Dutch soldiers from the windows of houses, while over a hundred Ger. and Dutch Nazis took possession of strategic points in the centre of the city. In Rotterdam the Gers. succeeded, with the help of the F. C., in occupying the Stock Exchange in the heart of the city and the Marine Barracks, well in advance of the actual invasion of the city. One of the most prominent Dutch fifth columnists was Anton Mussert (1894-1946). By F. C. co-operation the Ger. occupation of the Rotterdam airport was facilitated. In Belgium, the Rexist leader, Léon Degrelle (b. 1907) lent the support of his party to the Gers. Probably F. C. activities played some part in the rapid collapse of Fr. morale in June-July 1940, though the truth was that a large

proportion of the bourgeoisie was in full decay and undermined for many years previously by quasi-Fascist tendencies, not so much through any real sympathy with their hereditary enemies' but out of a fear of the predatory intentions of the Communist elements in France.

Fifth Monarchy Men, religious sect in England in the time of Cromwell, who thought his government was a preparation for the 'fifth monarchy,' during which Christ should reign on earth. They advocated a code of law based on that of Moses, and when they saw their hopes not likely to be fulfilled, turned against Cromwell. Their leaders were arrested, but after the Restoration the sect again gave trouble; the insurrection was suppressed, and Venner and ten others were executed for high treason.

Fig (*Lat. ficus*), name given to the members of a genus of shrubs and trees which belong to the sub-order Urticaceae, included in the natural order Moraceae.



FIG

Fs. are characterised by their pear-shaped receptacles which, by curving inward, form an almost perfect cavity, on the surface of which grow numerous flowers, the sterile and fertile being intermingled. They abound in tropical and sub-tropical regions, occur in about 300 varieties, and range in size from small trailing shrubs to huge trees, like the gigantic *bo* (*Ficus religiosa*) described by Emerson Tonnent as growing near Anarajapoor, in Ceylon, and traditionally said to be one of the oldest trees in the world. The *F. Rumphii* and the *F. religiosa* are deemed sacred by both Buddhists and Brahmans. The latter, called also the 'peepul' or 'bo,' is a large tree with heart-shaped leaves, and is cultivated in S. Asia. (See also BO-TREE). Caoutchouc is obtained in large quantities from the *F. elastica*, or India-rubber tree of the E. Indies—a tree remarkable for its pink buds and its great, shiny, oblong leaves, but, above all, for its gigantic roots, which group themselves snake-wise round the

base. All over India the *F. bengalensis*, popularly known as the banyan, flourishes and covers yearly an ever-increasing area with its vast canopy of foliage and branches. For each branch sends down its own root, which, growing to the surface, becomes in its turn the parent to new growths, and so both roots and branches multiply apace. The dessert fruit of commerce is grown from the *F. Carica*, so called because, according to legend, the famous *F.* trees of Attica were originally imported from Caria in Asia Minor. In this species the leaves are deeply lobed in the cultivated tree, though often almost entire in the wild they grow alternate and are rough and deciduous. Single receptacles spring from the axils of the leaves, the numerous single-seeded pericarps being packed close together inside. In colour the fruit varies from pale yellow to purple and bluish-black. 'Caprification' was long since introduced as an artificial aid to fertilisation. Probably the *F.* is indigenous only in Asia Minor and Syria, spreading thence all along the Mediterranean. Cardinal Pole introduced it into England, where on southern walls it can be cultivated with success; and in the United States it is grown profitably as far N. as Pennsylvania. The *S.* of France, the Spanish peninsula, and Asia Minor supply most of the *Fs.* for Great Britain, the best kinds being shipped from Smyrna. In the warmer climates there are two crops, one from the buds of last summer and the other and more plentiful crop from the spring shoots, which ripen in the autumn. In *S.* Europe and *W.* Asia *Fs.* form an important article of food, being eaten fresh and also in the form of a mashed cake, whilst medicinally they are used for chronic constipation and also for gumboils. *F.* wine is also brewed. Before being shipped abroad the *Fs.* are usually dried in the sun, or in ovens, being pulled and extended by hand during the process, after which they are compressed in wooden cases.

Figaro, famous character of dramatic fiction, who made his first appearance in the *Barber de Séville*, 1785, and the *Mariage de Figaro* of Beaumarchais. The word 'figaro' seems to have meant 'wigmaker' and to have been common to Sp. and It. Since Beaumarchais' time *F.* has become the type of ingenious roguery, intrigue, and cunning, who displays the utmost sang-froid in all his daring deceptions. He appears conspicuously in Mozart's opera, *Marriage of Figaro*, and Rossini's *Barber de Séville* (1816), and is sometimes represented as a barber, sometimes as a valet de chambre.

Figaro, *Le*, popular Fr. newspaper, which was started in 1854 by H. de Villermessant and his colleagues. In the early days its ready sale depended not a little on its light, chatty 'paragaphs,' which were introduced instead of the literary, but often rather ponderous, articles in vogue before. It was not until 1866 that the paper appeared daily. The first jour. of the name, which, of course, was borrowed from Beaumarchais' well-known opera, was pub. in 1826, and was in cir-

ulation till 1833. During its short life it counted George Sand, Paul Lecroix, and Jules Janin among its contributors. The present paper in the early days was aggressive, and at one time was almost wrecked by the revolutionary articles of Rochefort. After the death (1879) of Villemessant, who had given *Le Figaro* a distinctly monarchical bias, the management passed into the hands of François Magnard, Périer, and De Rodays. Its quieter tone, compared with the earlier issues, was largely due to the good offices of Magnard, who died in 1894. In the Second World War, it was pub. from 1940 to 1942 in the unoccupied zone of France, but ceased pub. on the Ger. occupation. In politics the paper is Conservative.

Figéac, Aimé Louis and Jean Jacques Champollion-, see CHAMPOLLION-FIGÉAC.

Figéac, cap. of an arron. in the dept. of Lot, S.W. France. Situated on the banks of the Célé, in a deep valley surrounded by vine-clad, rocky hills, it lies 32 m. E.N.E. of Cahors on the Orleans Railway. Brewing, cloth-weaving, dyeing, and tanning are the chief industries, but the tn. is notable for its picturesque old houses. Pop. 5700.

Figig, or **Figig**, walled oasis in the Sahara, 165 m. E.S.E. of Fez, near the frontier of Algeria in S.E. Morocco. It is an entrepôt for the Timbuktu and Mecca caravans. Pop. 15,000.

Fighter, aeroplanes whose specific purpose is, strictly, the antithesis of that of the bomber (*q.v.*), though there are fighter-bombers, and bombers are armed to defend themselves when attacked. Primarily the function of *F.* planes is to stop hostile bombers, reconnaissance, and photographic aircraft from flying over one's own ter.; another function is to fly in formation over hostile ter., as escorts, and attack hostile formations intending to attack home-based bombers and photographers or reconnaissance aircraft operating over enemy ter.; another duty of the *F.* is to attack enemy aerodromes or carry out, single-handed, specialised raids on selected targets; to this function, somewhat later, was added trench- or ground- striding, i.e., attacking hostile troops in trenches or on roads or railways; while, in the Second World War, another important task was that of 'tank-busting.' The *F.* was evolved from the 'single-seater scouts' of the First World War, the first being the 'Sopwith Tabloid,' predecessor of the Hurricane, and the Bristol Bullet, ancestor of the Blenheim. At first the pilots of scouts were merely armed with revolvers, but soon machine-guns were fixed in single-seaters. A notable development was the Fokker designed with synchronising gear which enabled the machine-gun to be fired between the blades of the airscrew. It seems that the first planes designed as 'fighters' were two-seat 'pushers'—that is, with a real propeller behind and not a tractor screw in front. The De Havilland DH1 was a two-seater biplane with a gun at the nose, and its successor, the DH2, was a single-seater with a swivel gun. About this time (1916), too, the stream-lined

tractor type, fitted with twin synchronised guns in front, ousted most other machines. All these early Fs. were biplanes, excepting the Bristol Bullet, which was a single-seater monoplane.

In the 1930's Brit. aircraft builders produced the famous Hawker series, constructed with steel tubing covered with fabric. Among these were the Fury and the two-seater Demon. The Fs. of this period were officially styled 'interceptors' from the assumption that their main duty was to take to the air and intercept hostile aircraft as soon as the latter were signalled from the coast. This purely defensive function was, however, too limited, and it was not long before a strongly offensive technique was worked out largely through the initiative of Lord Trenchard. The first Spitfire came in 1936, and almost at the same time the first Hurricane. Revolutionary changes were introduced in these famous aircraft. The interruptor and synchronising gear was abolished, with all its weight, complexity and liability to accident and error. The guns—eight fitted in the wings—fired clear of the airscrew and when the Second World War broke out it was soon found that the later Spitfires were far superior in manoeuvrability and fire-power to the much advertised Messerschmitts. The Hurricane was, at that time, a little slower than the Me109 but had the advantage over the latter if it started the duel at a higher level. In 1918 the Lewis and Vickers guns fired at the rate of 600 rounds a minute. Spitfires and Hurricanes, at the opening of the Second World War, flew at more than 350 m.p.h. and fired their eight guns at the rate of 1200 rounds per gun per min. or 160 rounds a sec. The evacuation from Dunkirk could not have been accomplished but for the Fs.—Hurricanes, Spitfires and Defiants—which literally massacred the Ger. bombers and suffered only the lightest losses relatively to the great execution wrought on the enemy. The supreme triumph of the Brit. Fs. in the Battle of Britain (q.v.) is an epic in the hist. of the nation. Here for the first time the Brit. Fs. encountered regular formations of the Messerschmitt 110, the two-seater two-motor F. which was sent to protect the Ger. bombers after these had suffered crushing losses when invading without escort. The Spitfires and Hurricanes, however, in spite of the guns carried aft in the Messerschmitt, found that they were able to break up these formations as easily as they had brought down the Me109 single-seaters. A later development was the night-flying F. which had to fly above the gun barrage or at any altitude over 14,000 ft. The earliest night-fighters of this period were Sopwith Camels, and later, Sopwith Snipe, with 250 h.p. Bentley rotary motors. Another famous F. machine of the early 1930's was the Gloster Gladiator designed by H. P. Folland. With a Mercury motor of 725 h.p. the speed of the Gladiator, though not equal to that of the monoplane Fs., reached 250 m.p.h. and it carried four guns. The early hist. of the defence of Malta in the Second

World War was remarkable for the heroic resistance of the Brit. pilots in their heavily overworked and old model Gladiators. Equally, too, in Norway and in North Africa in the early period of the war, this machine justified its existence.

Among the best-known Fs. in the Second World War were the Vickers-Armstrong Spitfire, Hawker Hurricane, Hawker Typhoon, N. American Mustang, Curtiss Kittyhawk, Curtiss Warhawk, Bell Airacobra, Lockheed Lightning, Bristol Beaufighter, Westland Whirlwind, and De Havilland Mosquito (night fighter). The Vickers Armstrong Spitfire was derived from the Vickers-Supermarine S.6B, which set a world's speed record in Sept. 1931 of 407.5 m.p.h. and won the last of



De Havilland

'VAMPIRE' JET FIGHTER

the Schneider Trophy races for Britain at an average speed of 340.8 m.p.h. The Spitfire V.B. carried two cannon and four machine guns; was fitted with the Rolls Royce Merlin 45 engine and its speed in 1943 was 360 m.p.h. The Hawker Hurricane began, like the Spitfire, with eight machine-guns fitted in the wings; later it was equipped with twelve machine-guns and, finally, with the Bofors size guns. Its speed (without carrying a bomb load) was 322 m.p.h. and, like the Spitfire, it had a Rolls Royce Merlin engine. The Hawker Typhoon was a development of the long line of successful single-seater Fs. produced during the preceding thirty years by the Hawker and Sopwith Companies. Just as the Hurricane was the outcome of many years of experience in the design and construction of high speed types, famous among which were the Woodcock, Fury, Hawfinch, and the Hart, so the Typhoon was the logical development of the Hurricane. The Typhoon

was a single-seater, low-wing cantilever land monoplane with retractable undercarriage and tail-wheel, designed for both day- and night-fighting duties. It was powered by a Napier Sabre liquid-cooled engine, which, with its 2200 h.p., concentrated into a small space more power than that developed by a Royal Scot locomotive. There were two alternative types of armament, consisting either of twelve .303 Browning machine-guns or of four 20 mm. Hispano guns. Its maximum speed in level flight was over 400 m.p.h. and operational pilots obtained readings of well over 500 m.p.h. in the dive. Tactically the Typhoon proved of great value in dealing with tip-and-run raiders—usually Focke-Wulf 190's which repeatedly tried to cause damage to places on the coast in 1942-43. When used like a dive-bomber the Typhoon carried a 500-lb. bomb under each wing in addition to normal armament. The Typhoon was highly effective in 'tank-busting' attacks at the Battle of the Falaise Pocket (see FALAISE). The Lockheed Lightning, though in service with the R.A.F. for 1942, was more generally associated with the U.S. Army Air Forces. It was a twin-engine P. designed in 1937. In its later development it was powered with 1150 h.p. liquid-cooled Allison turbo-supercharged engines and its maximum speed was nearly 400 m.p.h. at 16,000 ft. Its most usual armament, grouped in the nose of the pilot's nacelle, was one 20-mm. cannon, two .5 and two .3 machine-guns. Later types of P. aircraft were jet-propelled or turbine-driven. See C. G. Grey, *British Fighter Planes*, 1941; Maj. O. Stewart (ed.), *The Royal Air Force in Pictures*, 1943.

Fig Marigold, see *MESSEMBRYANTHEMUM*.
Figueira da Foz, seaport, at the mouth of the Mondego, in Coimbra, Portugal. It is the terminus of the Guarda-Figueira and Lisbon-Figueira railways, and was formerly in the prov. of Beira. The exports are wine, olive oil, grain, and fruit. Pop. about 8000.

Figuera, tn. and fortress on the Barcelona-Perpignan railway, 14 m. S. of the Fr. frontier, in Catalonia, Spain. F. is on the fertile plain of El Ampurdan. Ferdinand VI. (1716-59) built its citadel. Pop. 10,000.

Figueroa, Francisco de (1540-1620), Sp. poet, reveals in his pastorals and his blank verse, which he introduced into native literature, the influence of It. literature. It was for his pastorals especially that his contemporary admirers gave him the ambitious title of 'Divine poet.'

Figurate Numbers, succession of series derived from any arithmetical series. The series derived from the natural numbers is obtained as in the following table:

	1, 2, 3, 4, 5, 6, etc.
1st order	1, 3, 6, 10, 15, 21
2nd order	1, 4, 10, 20, 35, 56

Here it is seen that the first order is obtained by adding 1, 2, 3, etc., terms of the natural numbers, the second order is obtained by adding 1, 2, 3, etc., terms of the first order, and so on. The

numbers of the first order in the above case are called triangular, as equilateral triangles are formed with such numbers of points placed equal distances apart,

thus:

etc. Square F. N. are the first order obtained from the series 1, 3, 5, 7, 9 The first order is 1, 4, 9, 16 and

may be represented by

and so on. From the series 1, 4, 7, 10 are obtained pentagonal numbers, 1, 5, 12, 22

Figure, (1) in geometry, a diagram drawn to illustrate a plane or solid shape. (2) in music, short phrase, especially one which assumes a distinctive character in the course of a composition by repetition or thematic use.

Figured Bass, see THOROUGH BASS.

Figurehead, figure, statue, bust, or other device attached to a ship's prow immediately under the bowsprit. Merchant vessels used to have timber volutes or scrolls in place of figures, but the fashion of figureheads had gone out before the introduction of steamers, whose bows, therefore, are usually plain. The huge figurehead of the fighting *Téméraire* and many belonging to other ant. battleships may still be seen at Millwall.

Figwort, name applied to the Brit. species of *Scrophularia*. *S. nodosa* and *S. aquatica* are perennial herbs with brown flowers visited almost exclusively by wasps. They were once used medicinally in accordance with the doctrine of signatures to cure the 'fig' or piles.

Fiji Islands (formerly Feejee or Fidji), island group to the N. of New Zealand, mainly extending between 16° and 19° S. There are some 250 is., of which many are uninhabited islets and rocks, and the gross area of the group, which extends 300 m. from E. to W. and 300 m. N. to S., is 7435 sq. m. The is. are mainly volcanic in origin. Generally speaking, on the S.E. side of the is. are forest and jungle, whilst on the other, or lee-side, is grass land with a less proportion of timber. The climate is cool for the tropics, and though the rainfall varies greatly in the different is., there are no months when some rain does not fall. Meteorological stations have been estab. at Mbau and Delansan. The chief crops are sugar, maize, coconut, tobacco, coffee, arrowroot, a little tea, and cotton, of which the quantity has increased of late years. Most of the natives are engaged in the plantations, but in addition, Indian coolies and labourers from other is. are introduced to work for a period of years: these labourers and the conditions of work are wholly under the control of the gov. Horses and sheep are reared, and there are a few wild cattle. Chief exports are gold, sugar, fruit, coconuts, bananas, cotton, maize, trocas shell, etc. Most of the trade is done with New Zealand, New S. Wales, and Victoria. The trade returns for 1937 showed that the total value of the exports

was £2,213,000 and of imports £1,761,000. The seaports of the is. possess good harbours, protected by coral reefs. The cap. is Suva, on the S.E. shore is Viti Levu; the chief is. are Viti Levu (4250 sq. m.), Vanua Levu, Kandavu, Mango, Vulanga, Yathata, Vatuvata, Mothe, Mbau, Mbalavu, and Rotumah. The constitution of F. is regulated by letters patent of Feb. 9, 1929. There is an Executive Council, consisting of the Governor, the colonial secretary, and other high officials, together with the two unofficial members nominated by the governor; and a legislative council consisting of the Governor and sixteen official members, five European, five native, and five Indian members. The natives retain a large share of self-gov., and their system of vil. and dist. councils has been recognised, and

The F.I. were first seen by Tasman, in 1643, and named by him Prince Wm's Islands. Capt. Bligh, set adrift in an open boat by the mutineers of the *Bounty* passed among the S.W. portion of the group in 1787, being the next European navigator who is known to have sighted the is., Capt. Cook having been only informed of the existence of a large is. named Feejee, three days sail to the N.W. by W. of Tonga-tabu, by the natives of that group. The missionary ship *Duff*, in her passage from Tonga-tabu to China in 1797 got entangled among the smaller is. forming the E. div. of the archipelago, of which her master Wilson made an incorrect plan. More or less regular communication with the people was begun by various masters of vessels plying in the sandalwood trade; but for long European intercourse was very limited owing to the evil reputation of the islanders, who were given over to cannibalism. D'Urville, who paid a short visit to the Fijis in 1827, gave the first authentic account of the is. and their inhabs.; and it was not until 1835 that a Christian mission was attempted by the Wesleyan ministers from Tonga, nor until sev. years later that their efforts met with any success. The want of a regular survey was at length supplied by a United States Exploring expedition which, under Capt. Wilkes, performed that service in 1840. The narrative of this expedition contains a mass of information on the manners, laws, religion, and language of the islanders, and long remained the best, if not the only record of them. But an excellent account of them will also be found in the *Journal* of Captain John Elphinstone Erskine, R.N., who cruised among the is. of the W. Pacific in H.M.S. *Havannah* in 1853. In this *Journal* he gives a graphic account of the very remarkable chief Seru, son of Tanoa, who took the name of Thakombau, meaning 'make-bad Bau' from his having raised an insurrection in Bau which consolidated the authority of his father Tanoa. Thakombau, however, became involved in tribal conflict with Maafu, who had made himself chief of the Windward group of is. Thakombau hoped that by giving up cannibalism and embracing Christianity he would secure the necessary ascendancy; but eventually in 1858 offered the sovereignty of the is. to England to get out of his difficulties, among which was the impossibility of complying with an Amer. demand for a large sum of money for alleged injury to the Amer. consul. Nothing came of the offer; but, in 1871 constitutional gov. was formed by certain Englishmen under Thakombau. This soon led to debt and deadlock among the settlers who by now had considerably increased in numbers from the original body which had gone out from Australia. The Brit. Gov. in the interests of all parties then accepted unconditional cession and F. became a Brit. colony in 1874. The pop. in 1936 was 198,379 (97,651 Fijians, 85,000 Indians, 4028 Europeans, 4574 of European and native descent, and some Polynesians and others). See A. Agassiz,



E.N.A.

A FISHER GIRL OF INBEBU, FIJI ISLANDS

improved, and supplemented by a triennial meeting of chiefs, over whom the Governor presides. The Education Ordinance, 1916, aims at the estab. of a system suitable to the needs of the colony as a whole and of the various races; and a board of education has been created under a director of education. This board has power to establish gov. schools both secondary and primary, and to assist undenominational schools. There are two grammar schools at Suva for Europeans, one for boys and one for girls. There are 68 gov. and assisted schools, 22 for Indians, 33 for Fijians, and 8 for Europeans, other races and half-castes. There are also numerous primary schools conducted by Methodist and Rom. Catholic missions, and vil. schools supervised by native teachers. The natives are a dark-coloured race of a Polynesian type and were formerly notorious cannibals. The spelling of Fijian names varies considerably owing to the peculiar pronunciation.

The Islands and Coral Reefs of Fiji, 1899; B. Thomson, *The Fijians, 1908*, and *Government of Fiji The Colony of Fiji, 1924*; W. A. Chapple, *Fiji: Little India of the Pacific, 1942*.

Filadelfia, tn., 13 m. S. of Nicastro, in the prov. of Catanzaro, Italy. Pop. 6000.

Filament, in botany, is the stalk of the stamen, at the apex of which is borne the anther or pollen case. F. is also used to describe a combination of cells which are connected only by their contiguous ends, as in many algae, hairs etc.

Filangieri, Gaetano (1752-88), Neapolitan jurist and writer, was a barrister of note and a leader of the Liberal cause. For one year before his death he acted as financial minister to Ferdinand IV., but his *Science of Legislation* (1780-85) is his title to fame. In this work he discusses the principles of justice both in theory and practice in such a way as to prove himself an historian of learning and true philosophical insight. The influence of the *Contrat Social* is traceable throughout.

Filariasis, diseased condition due to the presence of the parasite *Filaria sanguinis hominis*, or allied forms. The adult *Filaria* was discovered by Bancroft of Brisbane, and its embryo was discovered in the blood by Dr. Timothy Lewis. The embryo is known as *microfilaria sanguinis hominis nocturna*; it inhabits the lymphatic vessels and makes its appearance in great numbers in the blood at night time. They are about .35 mm. long. Other species are *microfilaria perstans*, which is found in the blood both day and night, and *microfilaria diurna*, which is found in the peripheral circulation only in the day-time. The larvae inhabit certain species of gnats or mosquitoes. The larvae are sucked from the blood by the mosquito and enter the stomach. They afterwards make their way to the base of the piercing apparatus, so that they can once more enter the body of a man when the mosquito bites. The alternative theory to this is that the *filaria* lives in the body of the mosquito until the death of its host, when it may be conveyed by wind to drinking water, by which it again enters the body of man. It has been observed that the blood of men may contain swarms of these parasites without any symptoms of disease being apparent. Under certain circumstances, however, they lead to dilatation of the lymphatics and a general disturbance of their function. The characteristic symptom of F. is the appearance of oedema in the urine. Chyle is the product of the digestion of fat; it is a liquid of milky appearance owing to the presence of small globules of fat, and under ordinary circumstances makes its way to the thoracic duct, ultimately appearing in the blood stream, where it undergoes combustion or is stored up as adipose tissue. When the lymphatics are obstructed by masses of *filaria*, the chyle is diverted from its normal course, and, besides causing hypertrophy of neighbouring tissues, appears in great quantity in the urine. The effect on the general organism is one of malnutrition and inflammation of the lymphatic vessels. In connection with the

hist. of the parasite in its second host, the mosquito, it may be noted that the larvae are not ejected when the mosquito is fed on banana pulp.

Filberts are the fruit of the cultivated *Corylus* or hazel; they are oval, elongated nuts that have a mild, oily taste, which makes them pleasant food. In England they are extensively grown in Kent, some farmers having 100 ac. under cultivation, which in a good year yield as much as 100 tons of fruit. As they weigh heavier unripe they are usually picked in Sept., whilst still green. Compared with the common hazels (*C. Avellana*), which yield cob-nuts, F. trees have a longer, less open cup or involucre, and are more lacerated. The F. is enclosed in the lacinated leafy cups of the female flowers, which look like clusters of coloured styles at the extremities of buds; their kernels are in some varieties surrounded by deep red pellicles. A F. tree, the stem of which rarely exceeds 2 ft., the tree itself being kept from 5 to 7 ft. high, is closely pruned each year, only the finest young wood, and the likeliest to bear blossom being left.

Fildes, Sir Luke (1844-1927), Eng. painter, b. at Liverpool; son of Jas. Fildes of Chester. Studied art at the S. Kensington and Royal Academy schools. He began his artistic life as an illustrator, and became a popular contributor to the *Cornhill* and *Graphic*; and also executed woodcuts for Dickens's last novel, *Edwin Drood*. The subjects of his earliest paintings were often sad in theme and cold in colouring, but his later works, especially the warmer pictures of Venetian men and women, represent the happier side of life. In 1902 he painted a portrait of King Edward VII., and in 1912 of King George V. He became R.A., in 1887, and was knighted in 1906; K.C.V.O. 1918.

File, steel implement, with teeth or serratures on its surface, much used for abrading and shaping metals and other hard surfaces. The art of filing is known to most savage tribes, hard stone or fishes' teeth being generally employed. Single-cut files, which are suitable for soft metals, have only one set of parallel ridges, whilst double-cut files have two courses or series of chisel cuts, the second, which is usually finer, being at an angle with the first. In shape they are various: 'flat' files have a rectangle for their section; rattail files, a circle frequently tapered; three-square files, an equiangular triangle. Most are 'bellied,' that is thicker in the centre, and in length they vary from $\frac{1}{2}$ in. (a watchmaker's) to over 3 ft. (engineers). Blanks are forged from bars of the best crucible steel and after being annealed and straightened are cut either by hand or by machine. The teeth are incised by a small stout chisel inclined at an angle of about 13° from the perpendicular, the chisel being hit sharply for each cut by a hammer. A skilled craftsman can strike as many as eighty blows an hour. The hardening and tempering of a file is a delicate operation, as excess of heat renders the steel brittle, and too little causes the teeth to wear down very rapidly, whilst hasty cooling

often warps the metal and so spoils the tool. The chief difficulty in the way of making thoroughly reliable machinery for file-cutting is that of adjusting the force of the blow to the hardness of the steel. Single-cut and double cut Fs. are graded according to the number of cuts per in., varying from fourteen to 100 or more. The grades, from rough to fine, are known as rough (always single-cut), coarse, bastard, second-cut, smooth, and dead-smooth (always double-cut). The tang or tapered end provided for fitting into a handle, is not included in describing the length of a F.

File (from Lat. *filum*, a thread, through Fr. (*fil*), used in the military sense as the opposite of a 'rank,' that is to say, it refers to an alignment from front to rear, one man being behind another, whilst 'rank' is an alignment abreast or from right to left. Three men now form a F., the Fs. being 'doubled' or 'trebled' if a denser formation is required: the number has been gradually reduced from sixteen, as it was in 1600. The 'rank and F.' of a regiment properly includes non-commissioned officers and men.

File-fish, see BALISTES.

Filelfo, Francesco (1398-1481), It. humanist; b. July 25, at Tolentino; son of a working man. Educated at Padua. In 1417, called to teach eloquence and moral philosophy at Venice. Known as expositor of Virgil and Cicero. Secretary to Venetian consul-general, Constantinople, 1419. Taught Lat. and Gk. at Bologna from 1427, from 1440 at Milan—where duke Filippo Visconti became his patron; to the honour of whose successor, Francesco Sforza, F. dedicated an epic, the *Sforziad*. He went to Rome in 1475; became prof. of Gk. at Florence, 1481, and died there, July 31 in the same year.

Filey, fishing tn. and fashionable summer resort of E. Riding, Yorkshire, situated 8 m. S.E. of Scarborough. The tn. is divided into two parts. The old tn. is just a fishing vil., while the new, which has developed since 1840, consists of two tiers, with pleasure gardens between. F. contains the remains of a Rom. harbour, which proves it to have been a Rom. station of some importance. Pop. 3700.

Filebusters (probably a Sp. form of our word 'freebooter,' derived from Dutch *vrijbuiter*) are pirates and, in general, adventurers who practise illegal warfare for their ends. Thus the Amer. adventurers who took part in the revolutions of Sp. S. America, with the purpose of increasing the anarchy to their own profit, were popularly called Fs., and in the United States the expression is frequently used of politicians whose one purpose is obstruction. Again, the expeditions sent into Spain against the Republicans, by Mussolini and Hitler during the Civil war were frequently and accurately described as filebusting expeditions. In England the word F. is also applied to a small fast-sailing ship. See also BUCCANERS.

Filescala, Vincenzo da (1642-1707), It. lyrical poet, who came of a noble Florentine family. He became famous on ac-

count of a series of odes written in commemoration of the victories of Sobieski. He is also noteworthy for the few very beautiful sonnets he wrote, the most famous of which was *Italia, Italia, O tu cui feo la sorte*. There is a trans. by Borrow in his *Wild Wales*. In 1864 a new ed. of his *Poesie e Lettere* was pub. See life by G. Caponi, 1901.

Filet (from Lat. *filum*, a thread; and *granum*, a grain), delicate jewel and ornamental work made of twisted gold or silver wire. The metal threads are finely interlaced, solder being used to strengthen the points of union, and are wrought into intricate volutes and spirals. In the 'Tara' brooch and other Irish work of the tenth and eleventh centuries, however, the design is skillfully contrived by a single long thread. To-day the best F. work comes from the United and Central Provs. of India, where the art has been practised from time immemorial, from Malta and from Scandinavia, where the daintiest silver buttons and brooches are fashioned, with a further decoration of tiny chains and pendants. F. patterns were often built on to a solid metal ground; in the Middle Ages the Moors of Spain used in this way to embellish croziers and reliquaries. Up to the twelfth century Byzantine goldsmiths lavished a great deal of artistic skill on F. work, and a few illustrations of their handiwork show that the art was well-known both to the Etruscans and the Celts.

Filetque Controversy, controversy on whether the Holy Spirit proceeded from the Father and the Son or from the Father only, the W. Church maintaining the former and the E. the latter.

Filipepi, Alessandro di Mariano dei, see BOTTICELLI, SANDRO.

Filippi, Cav. Filippode, see DE FILIPPI.

Filipino, a native of the Philippine Is., and, more particularly, a member of the Christianised races of Malay stock, generally with an admixture of Sp. blood.

Fillan, Saint, name of two distinct holy men of Scotland, whose festivals are held on June 20 and Jan. 9 respectively. The 'June' St. Fillan is the older of the two. He was called 'an Iobar,' the leper, and a church was dedicated to him at Loch Earn in Perthshire. The other was of Irish origin, being the son of Feredach of Munster and St. Keltigern. He died at Strathfillan in 777, and here as early as 800 an Augustinian priory was built in his honour. Within its grounds was the 'pool of Fillan,' whose waters accomplished miracles of healing. Two relics of this saint, the Quilgrich and a bell, are preserved in the Antiquarian Museum of Edinburgh.

Filet (from Lat. *filum*, a thread), architectural term, applied to the narrow ribbon-like bands, so common both in Gk. and Gothic architecture, to separate mouldings one from the other. Fs. also called 'listels,' are used between the fittings of Ionic and Corinthian pillars.

Fillmore, Millard (1800-74), thirteenth president of the U.S.A., rose, like many others who have held that office, by the sheer force of his own high abilities and

sterling moral character, and might with justice have said that he was handicapped rather than assisted by the accident of birth. In 1820 he broke away from his apprenticeship to a dyer, and having studied in Buffalo was called to the Bar in 1823, and prospered in his law practice. Having served in the state legislature of New York (1828-32) he next sat in Congress for eight years between 1833 and 1843. From 1850-53 he held the chief magistracy, succeeding President Zachary Taylor upon the latter's death, the office coming to him as the elected Vice-President. In policy he allied himself with the Whigs, supported measures framed to mitigate the evils of slavery, advocated protective tariffs, and in 1851 tried to prevent the invasion of Cuba, which the 'filibusters' urged. His active support of the Fugitive Slave Law endangered his popularity.

Filmer, Sir Robert (c. 1589-1653). Eng. writer on politics, matriculated at Trinity College, Cambridge, was knighted by Charles I., and being an ardent Royalist, had his house again and again pillaged by the Roundheads during the Civil war. In his *Patriarcha* (1680) and other pamphlets he develops to a ludicrous extent the theory of the divine right of kings. Yet the fact that Locke took the trouble to expose his fallacies *seriatim* in the *Treatise on Government* shows that at the time at least his theories made a grave impression.

Film Institute, British. Founded in 1933 and reconstituted in 1948 with an ann. grant from the Treasury, the B.F.I. is a semi-official body charged with 'the development of the art of the film, the promotion of its use as a record of contemporary life and manners and the fostering of public appreciation and study of it from these points of view.' In effect, therefore, the Institute acts for the film in the same way as the Arts Council of Great Britain (*q.v.*) does for music, drama, and painting. The Institute's main achievements so far have been the foundation of the National Film Library in which millions of ft. of film of priceless historical value are being preserved for posterity; the estab. of an Information Service on the cinema second to none in the world and the encouragement of the film society movement for the study of film at home and throughout the Commonwealth. The Institute also issues a number of periodicals dealing with various aspects of the film, and has sponsored the pub. of the first authoritative hist. of the Brit. cinema.

Films, see CINEMATOGRAPH.

Filmy Ferns are found native in the moist woods of the tropics, but many species are cultivated in Britain. In many forms the fronds are filamentous, and some have the appearance of Liverworts. They require a great deal of moisture, which is best obtained by growing them in closed cases; a cool greenhouse is sufficient, but they must be kept well guarded from the sun. They should be planted in sphagnum, peat, or fibre; ordinary soil is unsuitable. *Hymeno-*

phyllum and *Trichomanes* are the two genera, including the majority of F. F., of which there are about seventy species; but *Todea superba*, belonging to the Osmundaceae, is often cultivated.

Filters. Solid matter which is suspended, but not dissolved in a liquid, may be separated again by a variety of methods. The commonest is the use of F., by means of which the liquid is made to flow through one or more porous substances, which will not allow the suspended matter to pass. The simplest form of F. is that used in chemical laboratories, where a circular piece of blotting paper is folded into a quadrant and opened into a hollow conical shape. Placed in a glass-funnel this fits closely to the sides, and as the liquid is poured through, the precipitate collects on the paper, and can easily be removed. When liquids are dealt with which attack paper, glass, wool or asbestos fibres may be used instead of paper. One simple method of accelerating filtration is to use a funnel with a long stem. Another more effective method is to employ a Buchner funnel, i.e. a porcelain funnel with a perforated base on which a filter paper is placed. The funnel fits into a bottle with a side tube connected to a F. pump. Difficulties sometimes arise when crystallisation from hot liquids takes place in the funnel stem. To avoid this, double-walled funnels are used, the space between the two surfaces being filled with hot water. Some suspensions are of such a fine nature that the solid particles are not efficiently retained by ordinary F. paper, in which case the remedy is to use special paper with smaller pores. Even this will not suffice to F. colloidal solutions. For the ordinary purpose of filtering water for domestic use, a large number of F. have been devised. They mainly differ in the manner of drawing the dirty water through them. It is usual to use, as the filtering substances, sand and charcoal in some form. A home-made F. is often constructed of two flower-pots placed one inside the other. In the lower one is placed a sponge to plug the hole, then a layer of pebbles, upon which is a layer of sand with powdered charcoal resting upon it, and this in its turn held down by another layer of pebbles. In the upper pot is only a sponge to prevent the water flowing too fast into the F. By this means quite a pure water may be obtained. The F. which are manufactured for use on ship-board, and by soldiers, etc., work on this principle, but are constructed so that the sediment may be removed. So that this may be done, devices are used so that the water may be filtered as it ascends. Thus, if a F. has four compartments, and the water is stored in the top one, and passed by a pipe to the bottom one, then it will ascend through the middle chambers. This is the principle adopted in Leloge's F. When the stored water reaches the lowest chamber, it ascends through a porous filtering stone, to the filtering chamber, from whence it still ascends through a second stone to the chamber from whence it is drawn off. The

sediment can be removed from the lowest chamber by withdrawing a plug.

Another form of F. consists of a cylindrical pot containing the filtering media and with a long tube attached to it. This pot is lowered into the water, and by using the tube as a syphon (q.v.), the water is drawn up through the pot and filtered on its way. This method has been utilised for travellers and others who may have to drink from turbid sources. A porous cylindrical stone consisting of compressed carbon, is fitted on to one end of a flexible tube, to the other end of which is attached a mouthpiece. Then the traveller, lowering the filtering end into the pond, may drink clean water direct from the turbid source. Not only does filtration remove solid matter, but it is well known that charcoal acts upon any soluble organic matter which may be present, so purifying the water. This is of great importance, as very clear water may be highly dangerous to drink on account of the presence of organic matter. The length of time that the charcoal is efficient is, therefore, of the greatest importance. For this same reason charcoal is often placed at the openings from which issue deleterious gases, and so the air is filtered, rendering it inodorous and often innocuous. For filtering on the large scale F. presses are used. The simplest forms consist of a series of chambers connected with each other by a central hole. F. cloths inside the chambers retain the precipitate, and the filtrates are let out through taps at the bottom. See WATER and SEWAGE; and for other processes of clarification (q.v.) see BEER, OIL, SUGAR, SYRUP, WINE, etc. See J. Don and J. Chisholm, *Modern Methods of Water Purification*, 1911; J. A. Pickard, *Filtration and Fillers*, 1929.

In photography a filter is a piece of transparent material of graduated colouring placed between the object and the lens. Its purpose is to control the stream of light and thus to emphasise some special characteristic of the view or to obtain some special effect. A filter is used mainly in the photography of distant views, sunsets, outdoor portraits, and architecture. Where, however, the most up-to-date materials are employed the use of a filter is generally unnecessary. See also PHOTOGRAPHY.

Filurina, see FLORINA.

Fimbria, Gaius Flavius (d. 84 B.C.), Rom. soldier, was an enthusiastic supporter of the demagogue Marius, and was at pains to colour his partisanship by perpetrating needless barbarities against his enemies. Having slain Flaccus, his superior in Asia, at Nicomedia, he worsted Mithridates with Flaccus' army. Finally, he committed suicide rather than fall into the hands of Sulla, whose adherents in Asia he had persistently ill-treated.

Fin, see FINS.

Finale (It., word meaning 'end'), musical term, describing the conclusion of a composition. In instrumental music, that is, in symphonies, concertos, sonatas, quartettes, etc., it is the last movement, which is variously handled by different

musicians, as the recollection of Haydn's sprightly rondos and Beethoven's grand choral F. to his ninth symphony will immediately show. Mozart and other composers bring the sev. acts of their operas to a close by a concerted piece or F. Wagner, however, broke away from this practice.

Finance Acts, in Brit. administration, are formal Acts of Parliament which, after the Budget (q.v.) has been introduced by the chancellor of the exchequer, are necessary in order to give effect to its provisions. The first and more important of these is the Finance Act, which embodies the chief alterations in methods of raising revenue. This is occasionally a very long and involved document, as the utmost precision is necessary when such methods as those relating to Income Tax are revised; but where the changes are few and no fundamental system is affected the Finance Act may be one of the simplest and briefest for the year. The Appropriation Act, which follows, is a formal measure for voting the necessary funds to the various spending depts., and is usually supplemented at the end of the financial year by a similar measure which legalises any additional expenditure that may have become necessary. These Acts, as they deal chiefly with finance, do not require the approval of the House of Lords. When they have been passed by the Commons they are sent to the upper chamber with the Speaker's certificate attached declaring them to be Money Bills.

Finance, National, see BUDGET, TREASURY, PUBLIC DEBT.

Financial News, The, London morning daily paper, founded in 1884. Prior to its appearance the *Financier* (estab. 1866) was the only regular daily which attempted to give detailed news of markets, stocks and shares, prices, and of anything, in fact, which was likely to be of especial interest to business men. Now incorporated with the *Financial Times* (q.v.).

Financial Times, The, London morning daily paper, which first appeared in 1888. With it are incorporated the *Financier* and *Bullionist* and *Financial News* as the Financial Times Ltd. (Chairman, Rt. Hon. Brendan Bracken, M.P.) Offices, 72, Coleman Street, E.C. 2.

Fin-backs, see FIN-WHALES.

Finch, name given to members of the Fringillidae, a family of hard-billed singing birds which inhabit the N. hemisphere. They are almost unknown in Australia. The Fringillidae are divided into sev. sub-families, according to the formation of the skull and beak. The *Coccothraustinae*, or grosbeaks, inhabit the Old and New Worlds, and extend as far S. as India. Their bills are fairly stout and acute, and they have bright-coloured plumage, green and yellow predominating. The species *Ligurinus chloris*, or common green-finch, is often heard in gardens and small plantations. It feeds on the seed of the wild mustard and other weeds, and has plumage of olive yellow, shading to grey. Other members of this group are the *Coccothraustes vulgaris*, or European hawfinch, and the *Hedymeles virginianus*, or

rose-breasted grosbeak, a handsome and sweet-voiced bird. The sub-family *Fringillinae* are distinguished by their softer bills and by their cranial differences. The *Fringilla caelebs*, or common chaffinch, is a general favourite in the Brit. Isles, and may be seen nesting under the eaves of dwelling-houses. The plumage of the male is chestnut-brown, the crown and forehead black or slaty-blue, and the chin and breast pale red. The female is ashy-brown, shading to olive-yellow, the wings being pied with white. To this group also belong *Chrysomitris tristis*, or yellow-bird, a lively, graceful bird common to the United States and to Canada; also its European sister, *C. spinus*. The *Linaria cannabina*, or common linnet, is also a member of the F. tribe, and inhabits most parts of Europe, ranging eastward as far as Central Asia. The *Montifringilla nivalis*, or snow-finch, and the *Erythropsia githaginea*, or desert F., are rarer and even more beautiful varieties. The *Petronia domesticus*, or house sparrow and its allies, are true Fs.; so are the *Serinus hortulanus*, or serin F., and the *S. canarius*, or familiar yellow canary. The *Pyrrhula rubicilla*, or bullfinch, is another inhab. of the Brit. Isles. A further sub-order of the F. family is the *Emberizinae*, or buntings, which inhabit the N. parts of the Old World, and some parts of India.

Finch, Henage, first Earl of Nottingham (1621-82), Eng. jurist, was educated at Westminster School and Christ Church, Oxford, and later joined the Inner Temple. In 1660 he became solicitor-general, and the following year he entered parliament. When Shaftesbury was dismissed he was made lord keeper of the Seals (1673), and next year was promoted to lord chancellor. F. was a zealous churchman, declared in the House that gov. by bishops was inalterable, was vehemently opposed to Charles's Declaration of Indulgence (1663), and eagerly supported the Five Mile Act (1665). Burnet testifies to his forensic powers, and says that he was 'well versed in the law' but mentions also that he was ill-bred and vain. The high repute in which his contemporaries held him is shown by the fact that he framed for the Commons their congratulatory address to Charles on his coming to England.

Finchley, municipal bor. of Middlesex, and a healthy and popular residential dist. of Greater London, England. It lies 7 m. N.W. of St. Paul's Cathedral, in the Hornsey div. of Middlesex, and has three railway-stations, Church End (Finchley), E. Finchley, and Woodside Park (N. Finchley). F. Common is now built over, but it was once notorious because here Dick Turpin and Jack Sheppard waylaid travellers by night. Pop. 47,000.

Finck, Henry Theophilus (1854-1926) musical critic to the *New York Evening Post* and *Nation* 1881-1923; won distinction in philosophy at the univ. of Harvard (1872-76), and, having gained the Harris fellowship, studied psychology at Heidelberg and Berlin (1878-81). Among his many pubs. are *Wagner and his Works* (1893), *Grieg and his Music* (1899), *Mas-*

senet and his Operas (1910), *Richard Strauss* (1917), *Musical Progress* (1923), *Musical Laughs* (1924). He also wrote on gardening and gastronomy.

Finden, William (1787-1852), Eng. engraver, who worked mainly in collaboration with his younger brother and fellow-pupil, Edward Francis Finden (1791-1857). Earlier worked on book illustrations, engraving, e.g. Smirke's drawings for *Don Quixote*. The Findens soon estab. a school of pupils, who worked under their direction, and indeed actually executed most of the engravings which bear their name. The elaborate finish and precision were, however, the work of the Findens. After engraving the Elgin Marbles for the Brit. Museum, and illustrating Murray's *The Arctic Voyages* and Campbell's *Poetical Works*, the Findens pub. at their own private cost in 1833 the illustrations to Moore's *Life and Works of Byron*, a work which made so great a stir that it was followed by other works of a popular nature: *Landseer's Illustrations of the Bible*, after Turner, Calcott and others; *Landscape Illustrations to the Life and Poetical Works of George Crabbe* (1834). But the profits they had derived from these works were squandered in a well-planned and beautifully executed but luckless venture *The Royal Gallery of British Art* (1838), etc. F.'s last engraving on a large scale was that of Hilton's 'Crucifixion'.

Findhorn, riv. of Inverness-shire, Scotland, flowing through Nairn and Moray to the Moray Firth.

Findlay, city and cap. of Hancock co., Ohio, U.S.A., and lies 44 m. S. of Toledo. It stands on the oil and natural gas dists. of Ohio and carries on large manufs. of glass, machinery, pottery, brass, and steel. Pop. 20,200.

Findlay, John Ritchie (1824-98), Scottish newspaper proprietor, b. at Arbroath. He began his career in the office of the *Scotsman*, afterwards becoming owner of most of the property. He gave the Scottish National Portrait Gallery to the nation at a cost of £70,000.

Findon, (1) a fishing vil. of Kincardineshire, Scotland, from which Findon or Finnan haddocks take their name. (2) Vil. in the S. downs, Sussex, England. It is picturesquely situated in a vale and is not far from Clissbury Ring (J.R.).

Fine: (1) Pecuniary penalty payable to the state for an offence against the Criminal Law. It may be super-added to imprisonment or be the sole punishment. At common law a F. was rarely, if ever, imposed on conviction of treason or felony. Its place was taken by the forfeitures which followed on conviction and attainder, abolished in 1870 (33 & 34 Vic. c. 23). The Criminal Law Consolidation Acts of 1861 do not contain any powers to inflict a F. on conviction of felony (except in the case of manslaughter (24 & 25 Vic. c. 100, s. 5), nor is such a F. ever inflicted without statutory authority, e.g. under the Probation of Offenders Act, 1907. But under the Criminal Justice Act, 1948, any Court before which an offender is convicted on indictment of

felony (not being a felony the sentence for which is fixed by law) has power to fine the offender in lieu of or in addition to dealing with him in any other manner in which the Court has power to deal with him. By the same Act the Court may allow time for the payment of the amount of the F., and it may also fix a term of imprisonment which the person liable to pay the F. is to undergo if the sum is not duly paid; but any term of imprisonment so inflicted in default of payment of a F. may not exceed twelve months. As to misdemeanors: at common law the Court may impose as part or the whole of a sentence, a fine or ransom, i.e. a pecuniary penalty, or pecuniary forfeiture. There is no general statutory limit to the amount of such F., except the provisions of Magna Charta and the Bill of Rights, against excessive and unreasonable fines and assessments. (In the Second World War period and after, great Fs. were imposed for various offences against the safety of the realm created by war-time emergency legislation, e.g. failure to disclose receipt of dollar proceeds or possession of American securities; but it was expressly intended that penalties for contravention should be deterrents.) At common law a married woman could not be fined for misdemeanor: *R. v. Thomas* (case heard in King's Bench temp. Hard. reports 278); but since the Married Women's Property Act, 1882, there seems no reason why she should not be fined; and statutes authorising a F. are applied to married women as well as to other persons. In the case of conviction of a person under sixteen years of age powers are given to order the parent or guardian of the child to pay a F. instead of the child, etc. (Children Act, 1908—8 Edw. VII., c. 87, s. 99—re-enacted in later Acts). The parent or guardian may, however, appeal against such order. The Criminal Law Consolidation Acts of 1861 all contain a discretionary power to fine for misdemeanors within the Acts, and so does the Forgery Act, 1913, and the Larceny Act, 1916. In default of payment of the F. imposed being made forthwith the defendant may be committed to prison (see CRIMINAL LAW). Any misdemeanor under the Criminal Consolidation Acts, 1861, may be punished by F. in addition to or in lieu of other punishment. The following offences *inter alia* are punishable by F. in addition to or in lieu of imprisonment: offences against the Foreign Enlistment Act, pound breach (see BREACH), embezzlement (*q.v.*), maintenance (*q.v.*), champerty (*q.v.*), misprision of felony, contempt of court (*q.v.*), riot, rout, unlawful assembly, challenge to fight, common law conspiracy (*q.v.*), indecent conduct, false imprisonment, cheating, and forgery at common law. In the following F. is an alternative only: smuggling; attempting to obtain by false pretences. The punishments are cumulative in the following: seditious libel, blasphemy, and compounding felony. Under the Summary Jurisdiction Act, 1879, a court of summary jurisdiction, in cases where it has power to imprison on a summary conviction,

notwithstanding that it has no express power to impose a fine in any such case, may in its discretion impose a fine not exceeding £25 instead of imprisonment. Under the same Act both an English and a Scottish court of summary jurisdiction may, where it imposes a small fine, i.e. one not exceeding 5s., allocate the F. or any part of it towards the payment of the informant's costs. The mode of enforcing the payment of a F. is by distress and sale of the goods of the person convicted. (2) A collusive action at law (see FINES and RECOVERIES). (3) In the feudal system of land tenure denoted an agreement between a lord and his vassal prescribing the conditions of the latter's tenure; or a sum paid by a villein tenant to his lord for the privilege of giving his child in marriage. (4) A sum paid to the lord of the manor by a person on his admission on the rolls of a manor as owner of a copyhold estate. They were fixed at two years' improved value, e.g. if A. enters as tenant at £50 a year he pays £100; if he improves the land to the value of £100 a year, B., the next admittee, must pay £200. In many cases this archaism of the feudal system ate up practically all the interest of the admittee, and involved a gratuitous hardship in the case of persons who were merely succeeding to the estates of their parents. Copyhold tenure has now been abolished. (5) A sum paid for the renewal of a lease. Under the Settled Land Acts Fs. received on leases made by a tenant for life under his statutory powers must be applied as capital money for the benefit of the reversioners or remaindermen.

Fine Arts may be divided into two groups—the greater arts, which are sculpture, painting, architecture, poetry, and music; and a group of lesser arts, among them acting and dancing. The name F. A., with its Fr. equivalent *beaux arts*, and its It. *belle arti*, is given to these arts by reason of their fostering the love of the beautiful, although they may at the same time be useful—thus there are other minor arts which may be classed as fine if they fulfil the former condition. Among these is the work of the goldsmith, the potter, and the weaver, all of whom produce decorative as well as useful wares. Though in its widest sense the term 'Fine Arts' embraces poetry, music, dancing, and the drama, in its more usual and restricted sense it comprises only the three sister-arts of painting, sculpture, and architecture. 'The work of art,' according to Hegel, is 'a product of human activity and is made for man.' Its primary appeal is to his aesthetic sense; this is, indeed, its actual *raison d'être*, and the fact that it may add to his comfort or convenience, as in the case of an architectural work of art, in no way adds to its artistic importance. While philosophers do not attempt to decry the beauties of nature, they look upon them as being of a lower order than those which are classed under the heading of F. A.; for as Hegel puts it, 'the beauty of art is the beauty that is born of the mind; and by as much as the mind and its products are higher than nature and its appearances, by so much the

beauty of art is higher than the beauty of nature.' The crude beginnings of the arts of painting, sculpture, and even architecture, are found in very early times in the rough sketches scratched on prehistoric caves, in rude stone carvings, and in the erection of mounds of stone. For articles on each of the Fine Arts, *see* under individual headings. A good introductory text-book to the study of this subject is *The Fine Arts*, by G. Baldwin Brown, 1916.

Finedon, vil. in Northamptonshire, England, 3½ m. from Wellingborough, in which it is now incorporated. It has boot and shoe factories, and stone quarries. Pop. 4000.

Fines and Recoveries. These were fictitious or collusive actions at law, which were mainly instrumental in conveying land in spite of certain legal restrictions. Both were notoriously in use as a means of barring the entail (*q.v.*) of estates, thereby enabling the tenant in tail to sell the lands so as to defeat the rights of his own issue and of the remaindermen and reversioners (*see* **DE DONIS, ENTAIL**), while the common recovery was as constantly invoked to elude the Statutes of Mortmain (*see* **CHARITABLE USES**). A fine (*Lat. finis*, end) was formerly a common mode of transferring any freehold. Originally founded on an actual suit, it became later nothing more or less than an amicable compromise of an action, real or fictitious, whereby the lands which formed the subject of the action were acknowledged to be the right of one of the parties. It was so called because it put end and (*finis*) not only to the suit but also to all other suits concerning the same matter. The end of it was to bar issue, but not remainder or reversion, and instead of fee simple it created a 'base fee' lasting only as long as there were issue of tenant in tail, but allowing a remainderman or reversioner to come in upon the extinction of such issue. The effect of the fine was that the right of all strangers to the suit was barred, unless claim was made within five years. The common recovery was an invention of the ecclesiastics designed to enable them to hold land, notwithstanding the prohibition of conveyance to a corporation. It was an action actual or (generally) fictitious, in which the lands were recovered against the tenant of the freehold, the judgment so obtained binding all persons and vesting an absolute fee-simple (*q.v.*) in the plaintiff. In regard to estates tail the common recovery was first employed in Taltarum's historic case, and its effect was to defeat the rights not only of the issue of the tenant in tail, but of remaindermen and reversioners (*q.v.*) as well. Both F. and R. were abolished by the Fines and Recoveries Act, 1833. *See* **ENTAIL**.

Fingal, leader of the Fingallians, *see* **FINN**.

Fingal's Cave, *see* under **STAFFA**.

Finger Prints, patterns formed by the minute ridges on the fingertips differ in each individual; and not only do those which appear on the fingers of the newborn child remain unchanged throughout

its life, but those of no two fingers of the same individual have been found the same. It is this curious physiological fact that led to the idea of a system of identification of persons apprehended by the police by F. P. The system owes its practical application in this country to the ingenuity of Sir Edward Henry, who, when inspector-general of police in the Lower Provs. of India, perfected an effective system of classification of F. P. This system had been successfully adopted for years by the gov. of India before being adopted by the police of England and Wales in 1901. The existing orders of the Brit. Home Office provide for the registration by F. P. of all persons convicted at Quarter Sessions and Assize, and sentenced to a term of not less than one month's imprisonment, or at any petty sessional police or stipendiary magistrate's court of more than one month's imprisonment without the option of a fine, for the commission of any of a number of specified offences. Under the Criminal Justice Act, 1948, where any person not less than fourteen years of age is charged with an offence before a court of summary jurisdiction the court may, on the application of an officer of police not below the rank of inspector, order that the F. P. of that person shall be taken by a constable, who may use such reasonable force as may be necessary for that purpose (this provision is in addition to those of any other enactment under which the F. P. of any person may be taken). But if the person whose F. P. have been taken under this last-mentioned provision of the Act of 1948 is acquitted or discharged under the Indictable Offences Act, 1948, or if the information against him is dismissed, the F. P. and all copies and records of them must be destroyed. Persons coming within the Home Office orders are 'fingerprinted' by the warder staff at the prisons where they are confined, and the slips containing their F. P. are then sent for registration and record by the governors of the prisons to the 'Habitual Criminals' Registry, New Scotland Yard, London. Prison governors or officials are authorised to take F. P. of remanded prisoners, and these officials may use such force as may be necessary for the purpose. But no similar power is conferred on the police, and if a prisoner in the custody of the police declines to be fingerprinted, the police should apply to the governor of the prison to which the prisoner is remanded. Under the Criminal Justice Act, 1948, a previous conviction may be proved against any person in any criminal proceedings by showing that his F. P. and those of the person convicted are the F. P. of the same person. The method of proving a previous conviction under this section of the Act is by a certificate signed by (or on behalf of) the Commissioner of Police of the Metropolis containing particulars from the criminal records kept by him, or by a certificate signed by the governor of a prison or remand centre in which any person was detained certifying that the F. P. exhibited thereto were taken from him while he was so detained.



FINGER PRINT TYPES (ENLARGED)

- 1, Arch; 2, tented arch; 3, loop; 4, composite;
5, whorl; 6, detail of ridge course of 5

F. P. impressions are required in the passports issued by a number of countries, but not by the United Kingdom.

The method of taking what are officially termed 'rolled' impressions of finger patterns is to roll the prisoner's finger on an inked metal plate mounted on a wooden block and then to repeat the rolling operation on a paper form marked into ten spaces for the reception of the impressions of all ten digits. In rolled impressions it is the *delta* or point of divergence of the ridges after running parallel for a certain distance that is of such importance. In taking plain impressions the delta is ignored, but otherwise the detail is essential. After these operations are completed the prisoner signs the slip or form. The object of the 'plain' impressions taken simultaneously is to ensure the printing of the digits in their proper sequence: the plain impressions acting as a simple but completely effective check. Fig. 1 above is an enlargement of the 'arch' type; Figs. 2, 3, 4, and 5 are enlargements of the other three types, 'tented arch', 'loop', 'composite,' and 'whorl.' The 'delta' is marked with an arrow-head in the figs. There are two deltas in whorls and composites, one in a loop, and none in an arch. Where the police find clear impressions in the scene of some crime they are expected to take photographs of the same as quickly as possible and send them to New Scotland Yard, when the photographs will be developed, and, if necessary, enlarged and properly prepared for production in evidence.

Fig. 6 represents the ridge course traced from delta to delta. These deltas are important in comparing F. P. Any two F. P. may display one or two ridge characteristics in common, but the greater the number of characteristics taken the less the probability of mere coincidence. It is easy to establish that the probability of, say, any ten specially noticed characteristics in an impression occurring by chance in the impression of any other digit is $\frac{1}{10} \times \frac{1}{10} \times \dots \times \frac{1}{10}$, i.e. odds against all these similarities being found in two impressions, not those of the same digit, is over a million to one.

In primary classifications arches and composites occurring relatively infrequently are included under loops and composites under whorls. Given an accurate classification number or formula, a card properly located can readily be found in the bureau when wanted for comparison with the impressions of a suspect.

Classification can be simplified by the arithmetical rule for determining primary and secondary or sub-classification and ridge tracing. Secondary classifications are necessary to break up large accumulations of primary classifications into groups of convenient size. Sub-classes are therefore formed by reference to the occurrence of arches, tented arches, and *radial* and *ulnar* loops. A loop is *ulnar* (U) when the downward slope of the ridges about the core is from the direction of the thumb towards that of the little finger; and *radial* (R) when the direction is reversed.

Silver nitrate is often used in developing prints. This method was used in the trial of Hauptmann for the murder of the Lindbergh baby in America, and may be

superior to the old method of powder-dusting, because any light cloth can be treated by it. Theoretically F. P. remain indefinitely unless destroyed by excessive humidity, and as long as they endure they may transform silver nitrate into silver chloride. The system, is not, however, fully developed. See Sir E. Henry, *Classification and Uses of Finger Prints*, 1923; H. Faulds, *Practical Dactylography*, 1923; Vincent's *Police Code* (19th ed., 1931).

Fingers, Deformities of, see MANUS.

Finial, term applied to an ornament in architecture, used specially in the Gothic style. It was carved to represent foliage and terminated pinnacles, gables or spires. Though used earlier it was elaborated by about the twelfth century, and during the next two or three centuries the foliage of the leaves was imitated carefully.

Finiguerra Maso, or Tomaso (c. 1410-75), It. sculptor and goldsmith, b. at Florence, and is supposed to have been taught by Lorenzo Ghiberti. He was especially skilful as an engraver on metal—one piece of his work which still exists being very beautiful, 'The Coronation of the Virgin,' which is now in Paris.

Fining, see BREWING—*Cleansing*.

Finistère (from Lat. *Finis terræ*, end of the land), most W. dept. of France, with an area of 7229 sq. m. It is bounded by the Eng. Channel, Atlantic Ocean, and the depts. of Côtes-du-Nor and Morbihan. The coast is bold and rocky, with lofty cliffs of granite; the Pointe de Raz is the most dangerous headland. The interior has two chains of hills, stretching parallel from E. to W.—the Mt. Arrez, and the Noires; these are clothed with forest trees and heathland, while rich meadows and fertile valleys lie between. The climate is temperate with W., N.W., and S.W. winds. Over a million ac. are under cultivation, and the crops are wheat, rye, barley, oats, potatoes, flax, mangold wurzel, etc.; fruit and vegetables are exported. The grass lands are very extensive, horse and cattle breeding being an important industry. The mineral wealth is not great; coal and iron, lead, bismuth, and zinc are obtained, and granite, marble, and slate are quarried. The arrons. of Brest, Châteaulin, Morlaix, and Quimper are contained in the dept. Quimper is the cap., and Brest, the largest tn., is a military station. The manufs. are woollens and linens, sail-cloth, rope, paper, shipbuilding, etc. Pop. 756,000.

Finisterre, Cape, cape on the N.W. coast of Spain, in lat. 42° 52' 45" N., and long. 9° 15' 32" W. belonging to the prov. of Galicia. It extends into the Atlantic Ocean, and is the projection of a mt. height which rises about 2000 ft. above sea-level. The cape can be seen from vessels fifty m. out; a lighthouse is placed in a conspicuous position. The Eng. gained a naval victory off F. in 1747, when Anson defeated the Fr. adm. Jonquière; twelve Fr. men-of-war and six other vessels were captured by the Brit. In the same year Rear-Adm. Hawke defeated the Fr., and took six men-of-war.

Again, in 1805, Calderan Strahan gained a victory over the Fr. and Spaniards.

Finite, term applied (1) in mathematics to a line or space which is terminated or to a number which is limited; (2) in grammar to the tense of a verb.

Finite Differences, see DIFFERENCE.

Finland (Finnish *Suomi*, or *Suomen maa*, 'the land of fens and lakes'), republic of N. Europe. It is situated between the gulfs of Bothnia and F., and is bounded on the N. by Norway, and on the E. by Russia. Its land area Jan. (1945) was 117,975 sq. m. (excluding inland water area of 12,190 sq. m.). The Åland Archipelago (q.v.) at the entrance to the Gulf of Bothnia (area 560 sq. m. pop. 29,000) forms part of the Finnish Republic.

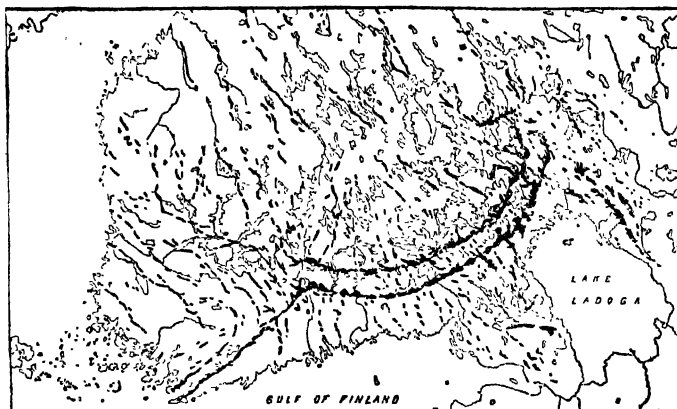
The coast-line of the country is deeply indented, like that of Sweden, and there are clusters of numerous small is. The interior is occupied by a labyrinth of large lakes and rocky basins filled with water, which are divided by low and flat hills and united artificially by means of canals. The chief lakes, prior to the war with Russia, were Lake Saimaa, drained by the Vuoksen over the famous Imatra Falls into Lake Ladoga; Enare, Näsi-Järvi, Pyhäjärvi, Ulea-träsk, and Pajane; but, after that war, F. lost her portion, the N. half, of Lake Ladoga, and further losses were sustained by the terms of the armistice of 1944. The prin. rivs. are Torneå, Kemijoki, Uleå, Tana, and Kymmene. South F. is watered by a number of short rapids, which are of use for working mills, and to some extent for internal navigation. Lake Saimaa is connected with the gulf of F. by a sluiced canal 36 m. in length. The surface of the country is flat, the highest mt. being Haldeifjäll (4126 ft.) in Lapland. In the S. the highest is Turismaa (754 ft.). Three-fifths of the land-surface is covered with forests, which yield valuable timber.

The minerals of F. are very limited. No coal is found, but about 22,000 tons of cast-iron are obtained annually, and there is also a small output of copper and silver. Some gold is found on the Ivalojoeki, in Lapland, and very fine granite is quarried from the Piterlaks mines. The surface of the country consists of such primitive rocks as gneiss, gabbro, and diorite. Cambrian, Silurian, and Carboniferous deposits are found along the coasts of Lake Ladoga and the gulf of F.

Agriculture is the chief industry of most of the pop., though only about 6 per cent of the land is cultivated. Rye is the chief crop, but barley, oats, wheat, hay, and potatoes are also grown. Butter and all kinds of dairy produce are exported in large quantities. The state encourages scientific training and provides instructors for the agric. and horticult. schools. Currants, strawberries, and raspberries are grown with great success, and the apple, pear, and cherry tree are cultivated in the S. Fishing is a prosperous industry, salmon, trout, perch, etc., abound in the lakes and rivs., and a kind of herring is caught off the S.W. coast. The manuf. industries include paper, chemicals, tobacco, cellulose, leather, etc., and there

are many saw mills and wood pulp works. The exports are mainly the output of the saw mills and wood pulp factories: sawn and planed timber, boxboards, and wood for paper-making, hides, pitch, and dairy produce. The many lakes, connected by canals, form an important system of internal communication. The canals are navigable at a length of about 2700 m. and floatable at a length of over 26,000 m. There are only 3000 m. of railway, all but 150 m. belonging to the State. There are 20,000 m. of high roads and 17,000 m. of other public roads. There are over

There are a number of polytechnic, commercial, nautical, and agric. schools. The country is governed by a president, elected for six years, a Council of State, chosen by him, and a House of Representatives consisting of one chamber of 200 members. Women have been enfranchised since 1907 and are eligible for the House of Representatives. Finland was thus the first country to concede women suffrage. Military service is compulsory, and there is also a volunteer organisation of Civic Guards for home defence.



This figure shows part of the Lake district of Finland, which owes most of its physical peculiarities to former ice-work. The whole country has been worn down almost level by the ice-sheet, which has left long moraines running N.W.-S.E., and chains of lake basins following the same general direction. The black lines on the diagram show these moraine deposits. Notice the great festoon of terminal moraines (*asars*) running at right angles to the rest.

28,000 m. of State-owned telegraph wires and over 200,000 m. of telephone wires.

The climate of F. is very severe during the winter, even along the S. coast where it varies in January between 20° and 30° Fahr. However, owing to the S.W. and W. winds, and to the proximity of the sea, the climate is less rigorous than it is farther E. in N. Russia. The winter lasts many months, and frosts have been known to destroy the crops as late as June. The ground is usually covered with snow from the middle of Nov. till late in April. In June, July, and Aug. the days are very long, and the weather dry and sultry. The ann. rainfall at Helsinki is 20 in. and along the S. coast 25½ in. Helsinki, Turku, and Hanko are the only ports open during the winter.

Education in F. is very advanced. There is a univ. at Helsinki, which has over 4000 students, 1000 being women, and two at Turku. Helsinki has also one technical and two commercial schools.

The pop. is 3,993,400. The bulk of the inhabs. are Finns, a people of Ural-Altaic stock. The rest of the pop. is made up of Swedes, Lapps in the N., Russians, and Gers. The vast majority of the pop. is Lutheran, but there is complete religious toleration. Helsinki (formerly Helsingfors), with a pop. of 338,800, is the cap., other important tns. are Tampere (Tammerfors), 87,100; Turku (Åbo), 81,400; Vaasa (Vasa), 36,500; Oulu (Uleåborg), 35,100; Pori (Björneborg), 33,900; Lahti, 32,300; Kuopio, 28,000; Jyväskylä, 22,600 and Kotka, 21,900.

Finnish is an Ural-Altaic tongue; and from 1883 it was placed on an equal footing with Swedish as an official language of the country; but subsequent to the creation of the Finnish Republic after the First World War the use of Swedish declined except in the Åland Is. in literature, too, until the end of the eighteenth century, Swedish was dominant, but there was a Finnish revival in

the first decades of last century, while the formation of an association for the promotion of Finnish literature in 1831 gave a new impetus to the study of the national language and to the collection and publication of popular songs and lyrics. Many of the modern Finnish novelists and poets, writers for the most part of the naturalistic school, enjoy a European reputation. Eemil Sillanpää was awarded the Nobel Prize for Literature in 1939. In music F. can claim Jean Julius Christian Sibelius (*q.v.*), who was born at Tavastehus, 1865, composer of the orchestral piece, *Finlandia*, among many other pieces, and of many symphonies, besides over a hundred songs.

HISTORY.—The Finns are said to have settled in F. during the eighth century, having been expelled from the banks of the Volga. Until the twelfth century they were pagans, when they were conquered by Swedes and adopted Christianity. They remained a dependency of Sweden for 500 years, but enjoyed autonomous gov. Russia repeatedly tried to seize the country from Sweden, and in 1721 by the treaty of Nysad, Peter the Great won that part of F. which forms the prov. of Viborg. In 1743, by the peace of Åbo, Elizabeth extended the Russian frontier to the Kymmene. In 1809 Sweden ceded the rest of the country with the Åland Is. to Alexander I. in the peace of Fredrikshamn. F. preserved its auct. constitution until 1897, when its autonomy was attacked by the Russian Gov. In 1899 Russia declared her right to legislate on Finnish affairs, regardless of the consent of the Finnish Diet, and between 1900 and 1902 the national Finnish forces were incorporated into the Russian army, and Russian was made the official language of the senate and of the more important public depts. There was great discontent in the country, and in 1904 Bobrikof, the governor-general, was assassinated. In 1905, the Constitutionalists and the Social Democrats formed a coalition, and taking advantage of trouble in St. Petersburg, succeeded in winning certain concessions from the governor-general, Prince Obolenski. The popular demands included the freedom of the Press, the deposition of Russian officials, and the reorganisation of the Diet on a basis of universal suffrage. These requests were granted and a single chamber of two hundred members was substituted for the old Diet of four chambers. Trouble was renewed in 1908 when the Russian Gov. again attempted to curtail the powers of the Finnish Diet, and in 1910 the 'Imperial Legislation Law' was passed depriving the Diet of its right to legislate on such questions as the imposition of taxes, police direction, school management, and the control of the Press, which, it declared, affected 'Imperial interests.' In 1911 the Russian Duma passed a Bill 'placing Russians on civil equality with the Finns in the grand duchy.'

In 1917, when the Russian Empire broke down, Finland declared itself independent, but Bolshevik aggression led

for some time to civil strife. Order was restored and matters finally settled between F. and Russia by the treaty of Dorpat, 1920.

Finnish-Russian War, 1939-40.—In the autumn of 1939 Finland was one of the small nations suddenly destined to be a pawn on the international chess-board. The extension of Soviet influence in the Baltic, following the estab. earlier in the same year of military, naval, and air bases in the three Baltic republics of Estonia, Lithuania and Latvia, offered an obvious threat to Finland. There were negotiations in Moscow on political and economic questions, but it was clear that Molotov, the Soviet minister of foreign affairs, was presenting demands incompatible with Finnish independence. Stalin's plain intention was to distort Finland's replies into something provocative to Russia—the technique employed by Hitler against Czechoslovakia and Poland. His real policy was to secure a hold on Finland by way of offsetting Ger. penetration in Scandinavia, and in his attack on Finland he undoubtedly showed considerable acumen in forestalling Germany's coming invasion of Norway of the following year. Soon after the Moscow negotiations had broken down, the Soviet Gov. denounced the non-aggression pact of 1932 on the ground that Finnish troop concentrations in the neighbourhood of Leningrad constituted a hostile act—the fact being that any concentrations must of necessity be close to Leningrad—and diplomatic relations were broken off. On Nov. 30 Soviet bombing planes began hostilities by attacking Helsinki and a number of other Finnish tns., including Viipuri (Viborg) and Enso. The fortress of Hanko was bombarded by Soviet warships and Petsamo seized. At the same time a so-called Finnish People's Gov. was set up at Terijoki by Kuusinen, a former secretary of the Komitea, the avowed object of this puppet gov. of the Soviet being to help the Finnish 'Democratic Republic' of revolutionary peasants and workers. This device, too, followed the familiar technique of Hitler in the case of Austria and Czechoslovakia in the process of dictatorial aggression. Although outnumbered, the Finnish forces at once offered a most determined resistance to the Russian invasion. Heavy casualties were inflicted on the Russians both in the Karelian Isthmus and to the N. of Lake Ladoga (Dec. 1) while on the next day Petsamo was recaptured. The soul of the Finnish defence was Field-Marshal Mannerheim, the 'liberator of Finland' from the Bolsheviks in 1919-20. The Finnish Gov., however, through the Swedish Gov., notified the Soviet of their desire to enter into fresh negotiations, but the offer was rejected. There is no doubt that, despite the bravery of the Finnish troops, the morale of the people was prejudiced by the bombing of the tns., especially as the Finns had but few planes with which to resist or retaliate. Large numbers of Russian tanks were destroyed and heavy casualties inflicted on their infantry in the course of the gradual with-

drawal of the Finns to the Mannerheim Line. The Russians then proclaimed the blockade of the Finnish coast of the gulf of Bothnia down to Hanko and twenty m. out to sea. On Dec. 4, Finland notified the League of Nations of her intention to fortify the Aaland Is. (*q.v.*) and to mine their waters. Very fierce fighting occurred from Dec. 10-16, especially on the Karelian Isthmus and N. of Lake Ladoga and all along the K. frontier, but the Mannerheim Line held firm. The Finnish Gov. then appealed to the world for help and issued a statement setting forth the circumstances leading to the conflict. It was obvious that if the Finnish account of the Moscow negotiations were accurate, she could never have acceded to the Soviet demands, which actually included a thirty-year lease of Hanko, the cession of numerous is., a port on the Karelian Isthmus, and mutual demolition of fortifications on the isthmus.

In the week Dec. 16-23, the Russians made desperate attempts by massed troop attacks to break the Mannerheim Line on the Karelian Isthmus, but were repulsed with very great losses. Man for man the Finns were superior to the Russian soldiers thus far opposed to them, besides being much better able to take advantage of the woody and snow-bound terrain. The cold was so intense on the Arctic front around Petsamo that operations there were brought almost to a standstill. Heavy damage was done on Dec. 18-21 to Helsinki in numerous air raids, as many as two hundred planes taking part in successive attacking waves. Once more President Kallio appealed to the world for assistance. Preparations were made in England to send a force, but the effort was frustrated by the assurance that both Norway and Sweden would resist their passage to Finland. However the Finns continued to offer a staunch resistance, defeating the Russians at Agiljavi, Salla, and elsewhere, and even crossing the Soviet frontier N. of Lake Ladoga; while in the far N., the Russians were also hurried back in retreat. Victories were also won at Lake Kianta and at Suonussalmi. The Soviet command retaliated by raining more bombs on Helsinki, Viipuri, Turku, Lahti, and other open Finnish tns., and these repeated raids undoubtedly told with cumulative effect on Finnish morale, although some 170 planes had been shot down. Between Dec. 1 and Jan. 9, some 234 persons were killed and 400 more or less seriously wounded in air raids and about 400,000 refugees from the tns. were evacuated into rural farm houses, schools, and churches to the dire disruption of the national economy. Yet a third appeal to the world was made by President Kallio, but, while there was some talk of foreign aid, only a few aeroplanes reached Finland, these being sent by Britain. In the penultimate week of Jan. many Soviet attacks were launched N.E. of Lake Ladoga in a new effort to outflank the Mannerheim Line, but the Finns still held firm. Further air raids were carried out by Russian planes on Nurmes, Petsamo

and other tns. Early in Feb., further attacks were made on the Mannerheim Line and near Lake Ladoga, the attacks making some impression at Sammu, but only at great loss to the Russians. Up to Feb. 7, the Soviet losses in material included 300 planes, 560 tanks, 300 machine guns and 200 other guns. The Soviet command now brought up some of their best shock troops in a determined effort to break the stubborn resistance of their adversaries. Massed attacks were made ceaselessly, with especial violence at Sammu, Muolaa and on the Taipale I., and at length the Finns were forced to withdraw from their advanced positions (Feb. 11-17); but they inflicted some 30,000 casualties on their attackers. Finland appealed in vain to the Swedish Gov. for military assistance, and by Feb. 25, the Russian offensive on the Karelian Isthmus had brought their forces close to Viipuri and compelled the Finns to evacuate the important fortress of Kovisto.

The massive Russian attacks were at last wearing down the gallant resistance of the Finns, who had now abandoned the W. part of the Mannerheim Line, and hostilities concluded early in March, the Peace Treaty being signed in Moscow a day or two later. Under it Finland ceded the Rybachy Peninsula in the N., some ter. in the N. centre, the Karelian Isthmus in the S.—including Viipuri, Viipuri Bay, and shores of Lake Ladoga and a 30 yrs. lease of the port of Hanko and neighbouring mainland. The total land and lake area ceded under the treaty being 16,170 sq. m. These terms were far more onerous than those presented by Russia in the Moscow negotiations of Oct.-Nov., 1939, especially as the ceded ter. included the whole Mannerheim Line defences, nor were any concessions made to Finland such as had been previously proposed by the Soviet. But at least Finland retained her independence as a reward for a resistance which will stand high in the epics of war. But for air attack it is possible that their forces might have held out against the Russian armies for a long time. The Russians in this campaign in Finland gave the world the first example of aerial bombardment of a civilian pop. on strictly scientific principles. Their aim was to paralyse the economic life of the country. These tactics were learned from the Gers. In Finland the vital spots for attack were the railway junctions, because the Finnish railway system was poor and easily put out of action. In carrying out these attacks the Russians used certain types of bombs among which were the so-called 'Molotov breadbasket,' a cylinder 7½ ft. long and 3 ft. in diameter, which collapsed in the air and poured out over a wide area upwards of 100 incendiary bombs. But Finland was able to hold out against its powerful enemy for as long as it did owing to the discipline of the people and the absence of any 'Fifth Column' in the country. This absence was due to the elimination of social injustice in Finland and the consequent acceptance by all sections of the pop. of the position that the war was their

war and not merely the war of one economic group or other in the country.

When Hitler invaded Russia in 1941 F. at once allied herself with the Axis (q.v.) and took part in the campaign against the Allies, reoccupying most of the territory ceded under the Treaty of 1940. In 1944 the Russians, who had been counter-attacking throughout 1943-44, at length made a determined effort to eliminate F. from the war. Finnish resistance was overcome, Viipuri falling on June 20. In accordance with conditions required by Russia the Finnish Gov. called upon the Ger. Gov. to withdraw Ger. forces from F. by Sept. 15. Four days after that date the 'cease fire' was sounded in F. and a peace delegation went to Moscow. On Sept. 19 an armistice was signed by Russia, Great Britain and Finland. Territorial concessions were severe. According to this Finnish troops were to be withdrawn behind the frontier fixed by the treaty of March 12, 1940, between the U.S.S.R. and F.: F. agreed to cede the Petsamo area and to lease for 50 years the Porkkala headland, with a considerable stretch of sea and land, for use as a military base. F. also undertook to pay 300 million dollars in reparations within six years. See E. Young, *The Land of the Thousand Lakes*, 1912; A. M. Scott, *Suomi, the Land of the Finns*, 1926; W. E. Hiley, *The Forest Industry of Finland*, 1928; J. W. Archley, *Finland*, 1931; Agnes Rothery, *Finland: the New Nation*, 1936; J. H. Wuorinen, *Finland: An Historical Survey*, 1938; W. N. Bugbee, *The Spirit of Finland*, 1940; J. Langdon-Davies, *Finland: The First Total War, 1940; Armistice with Finland (September 19, 1944)*, Cmd. 6586 (H.M.S.O.). (See further under EASTERN FRONT OR RUSSO-GERMAN CAMPAIGNS IN SECOND WORLD WAR.)

Finland, Gulf of, the E. arm of the Baltic Sea, having Finland on its N. shores, and Russia and Estonia to the E. and S. Its length is 260 m.: breadth, 25 to 90 m. Into it flow the Neva, draining the great lakes, Onega and Ladoga, and the Narva, draining Lake Peipus. It is connected with the Saimaa Sea, by the Saimaa Canal. The Finnish coast of the gulf is very dangerous, owing to the shoals and is. The water is slightly salt and not very deep, being covered with ice for about twenty weeks in the year.

Finlay, George (1799-1875), historian, was b. at Faversham in Kent, and was the son of Scottish parents. Most of his time was spent in writing the hist. of Greece, the first part of which, *Greece under the Romans*, was pub. in 1844. He wrote also *History of the Byzantine and Greek Empires from 716-1453* (1854), and *History of the Greek Revolution* (1861).

Finn, Fioun, Find, or Fingal, whose name was Find MacCumail, was in Irish legend the leader of the Fiann, Feinne, Fingallans, or Fenians, which was a militia formed of people from all parts of Ireland. Tradition says that he was the son of Cumail who lived in Ireland during the second century A.D. Those who were admitted to this band had to fulfil con-

ditions which were very strict and which inquired into their mode of living with close scrutiny. Among the many heroes of these people were Olsson—generally known as Ossian—who was his son; Oscar his grandson, and Diarmid. Goll and Conan were members of a rival branch of the family, and constant feuds took place between them. After the death of Cormac MacArt, and during the time of his son and successor, Carboy, their power was at its height, and they were eventually totally defeated at the battle of Galra, or Gavra, A.D. 283. It is said by some that Ossian escaped with his life. The stories of the Feinne and of their leaders form the subject of some of the later heroic literature of Ireland. See A. Nutt, *Ossian and the Ossianic Literature*, 1899.

Finnmark, prov. (or fylke) of Norway, in the extreme N., with a rocky, indented coast and a barren mountainous interior. Fishing is the main industry. Alten-gaard is the chief tn. and post. Pop. (chiefly Lapps) 53,700.

Finns, race of people of N. Europe inhabiting various countries, including Finland, Lapland, parts of the Baltic and the banks of the Volga, parts of Russia and W. Siberia. They belong to the Ural-Altaic race, originally inhab. of parts of Asia themselves, and their name is identical with the classic 'Feinne.' From the time of their migration to Europe they have been subject principally to the Swedes and Russians. Most of them now, however, lead a settled life, being engaged in the pursuit of agriculture or fishing, though few prefer a wandering life. They are of strong and robust physique, having rather a low stature, flat features, and fair or reddish hair. They are also brave, straightforward, and hospitable, and most of them have adopted the Christian religion.

Fins are organs extending from the bodies of aquatic animals, which help them to propel themselves through the water. In the case of fish they may be paired F. or median F., the former including pectoral and ventral F., and the latter caudal and dorsal F., these F. being supported by a series of bony rays. The F. in cetaceans are simple extensions of the soft tissue and have no bony rays. The term may also be applied to other aquatic animals, as in the case of the tadpole's tail. Among the invertebrates any expanded part of the body which helps in swimming is termed a F.

Finsbury, metropolitan bor. of London, England, bounded S. by the City of London, W. by Holborn, E. by Shore-ditch, and N. by Islington. Among the numerous places of interest are the Charterhouse, formerly a Carthusian monastery; Bunhill Fields, the burial place of Daniel Defoe, John Bunyan, and other eminent persons, and in the neighbourhood many victims of the plague were interred. S. of Bunhill Fields is the Artillery Ground, which since 1683 has belonged to the Honourable Artillery Company, with barracks and armoury. The prin. industry of the borough is watch-making, and working of precious

metals; there are also large printing works. F. returns one member to parliament. Pop. 90,000.

Finsbury Park, dist. which forms a suburb of N. London, situated 4 m. N. of St. Paul's. It consists of the eccles. pars. of St. Thomas, and St. John. Finsbury Park, from which the dist. derives its name, covers over 121 ac. It is horticulturally well arranged, and affords fine views. It is well planted with trees and shrubs, contains large conservatories, and an artificial lake, which is used for pleasure boats. A small portion of the park is reserved as a gymnasium for children.

the possession of Saxony, and in 1815 of Prussia and is now in the prov. of Brandenburg. There is a Gothic church of 1581, also a chateau and schools. The manufs. are cloth, cigars, and there are iron foundries and flour mills. Pop. 16,400.

Fin-whales or **Rorquals**, also called **Fin-backs** or **Razor-backs**, constitute the *Balaenoptera*, a genus of Cetacea. They are characterised by their elongated shape, short and recurved backfin, and a number of longitudinal folds in the skin of the throat. The F. are the most widely distributed of all whales, being



D. McLeish

THE AURLANDS FIORD, ONE OF THE GRANDEST IN NORWAY

Finsen, **Niels Ryberg** (1860-1904), Dan. physician, b. at Thorshaven, Faeroe Islands, took his degree in medicine at Copenhagen, where he lectured on anatomy. It was here that he discovered the effect of light upon certain diseases and made use of his discovery in their treatment. He advocated the exclusion of the chemical rays from people suffering from small-pox, maintaining that this prevented the pustules from suppurating, and used the ultra-violet rays for curing certain diseases of the skin, for example lupus. For this process he invented a lamp which collects the light by means of a quartz lens and also provides for cooling it. In 1903 he was the recipient of the Nobel prize. He wrote *Chemical Rays and Variola* (1891), and *Phototherapy* (trans. from the Ger. by J. H. Sequiera, 1901).

Flinsteraarhorn, highest peak of the Bernese Alps, in the canton of Berne, Switzerland, about 40 m. S.E. of Berne; it attains a height of 14,925 ft., in one of the prin. tourist centres of Switzerland. It was first climbed in 1829.

Finsterwalde, tn. of Saxony, Germany, situated on the Shackebach, 28 m. S.W. of W. of Cottbus. In 1635 it came into

known in all but the extreme Arctic and Antarctic seas; their scarcity of blubber and inferior whalebone has secured them a certain immunity from the whaler. *B. sibaldi* is the largest of all living animals, sometimes attaining a length of 80 or even 85 ft.; it spends the winter in the open sea and approaches the coast of Norway about the end of April. *B. muculus*, the common F., is found in the seas of N. Europe, and occasionally enters the Mediterranean, its length is from 60 to 70 ft. *B. rostrata*, sometimes called the pike-whale, because of its pointed muzzle, is the smallest species, varying from 25 to 30 ft. in length; it frequents the Norwegian fiords in summer, and is by no means rare on the Brit. coast.

Fiord, or **Fjord**, narrow inlet of the sea, having high coasts on either side, and cutting far into the land. These Fs., which are found on mountainous coasts, are exceedingly deep, the deepest part being that nearer to the land, while the bottom shelves up to the shore and the sides are often lined with waterfalls. They may have been formed by the constant wearing away of the rocks, the fissures being filled with sea water, or by the

action of a glacier, the pressure of the ice deepening the valleys. Fs. are found in Norway, Iceland, Greenland, parts of the Amer. coast and New Zealand. Those of Norway are among the most notable; Sogne F., one of the largest, being 100 m. in length, and Hardanger F. only a little more than half that length. Christiania (Oslo), Aurlands, and Trondhjem are also well known, the last being the scene of much naval and air activity in the Second World War in 1939-40, between the Brit. and Ger. forces. See also NORWAY.

Fiorin Grass, see BENT GRASS.

Fir, strictly speaking, is the popular name for *Abies*, a genus of coniferae, but the genus *Picea* and others are often included. The leaves are needle-shaped and in *Abies* have a rounded base; those of *Picea* are decurrent. *Abies* cones are erect, and when ripe the scales fall off leaving the upright axis standing alone; the cones of *Picea* are pendent. *A. pectinata* is the European silver F., *A. nobilis* is the Noble silver F. of America, *A. Nordmannica*, the Crimean silver F., *A. amabilis*, the red silver F. of U.S.A., *A. venusta*, the Monterey silver F., and *A. reticulata*, the Mexican silver F., *P. excelsa*, is the Norway spruce. All these trees are commonly cultivated, but the Norway spruce flourishes in severe exposed situations, and is widely distributed over N. Europe. The timber of this tree constitutes deal, and the trunks are used for masts, etc. There are many valuable products from other members of the order, e.g., gums, resins, pitch, etc., and *A. balsamea* yields Canada balsam.

Firando, see HIRADO.

Fir-bolg, in Irish tradition a race of early inhab. of the pre-Celtic pop.

Firdausi, **Firdousi**, **Firdusi**, **Ferdousi** (c. A.D. 940-c. 1020), Persian poet. He assumed this nom de plume, his real name being Abū'l Kāsim Mansur or Hasan, and is the author of the Persian epic *Shāhnāma*. He was b. at Shadab, near Tus. The source of his work was a hist. of Persia which, unlike other books, was preserved by the Caliph Omar, and Dakiki, the court poet of Mahmud, Sultan of Ghazni, was ordered to put it into verse. On his death the work was taken over by Firdausi. It was agreed by the sultan that he was to have 1000 gold coins for every thousand verses. When the book was finished, the labour taking over thirty years, silver instead of gold was sent to F. owing to the jealousy of the sultan's minister. The poet in anger wrote a satire on the sultan, and was afterwards compelled to flee from place to place. He went to Mazandaran, thence to Bagdad, and finally to Tus, where he died. The chief eds. of the poems are: Turner Macan, 1829; Julius von Mohl, pub. with a trans. into Fr.; J. A. Vailers, and S. Landauer, 1877-83; A. G. and E. Warner, 1905.

Fire (O. E. *fyrr*, Gk. *pur*; ultimate root supposed to be connected with 'purify,' cf. Lat. *purus*). Although the statement has been not infrequently made that tribes totally ignorant of F. have been discovered, the evidence on this point is very weak, and it is questionable whether such

a race is in existence at the present time. There are considerable variations of detail in the primitive methods of producing F., but they are all based on the principle either of concussion or friction. The simplest form of the latter, rubbing a stick along a groove in another stick, is practised among other places in Tahiti, Samoa, and the Sandwich Is. The stick is twirled round in a hole in the other piece of wood in Australia, Kamchatka, Ceylon, S. Africa, the W. Indies, N. and Central America, and as far S. as the straits of Magellan. Concussion has also been known as a means of producing F. from very early times, and such methods as striking two stones together, striking a stone on a piece of wood, or striking two bamboos together, are in use. The employment of a burning-glass is also of great antiquity: Aristophanes mentions one in *The Clouds*. There are many different legends as to the origin of F. In Gk. mythology, Prometheus brings down the torch he had lighted at the sun; Ukko, the Estonian god, strikes his stone with his steel and sends forth F. in the shape of lightning; in N. Amer. legend F. is struck from the hooves of the great buffalo as he gallops over the prairie, and thunder in the Hindu mythology is the clatter of the hooves of the sun's horses on the sky. Primitive man found it convenient to have a F. always burning in a public building hence the pyreaneum gradually became a religious institution, round which centred also all civil and political interests. The principle of an ever-burning F. was observed by the Romans, Egyptians, Gks., Persians, Aztecs, Peruvians, etc. If the F. of Vesta at Rome, for instance, went out, all business was suspended until it had been rekindled with appropriate ceremonies: and no Gk. or Rom. army crossed a frontier without carrying an altar on which F. from the pyreaneum always burned. Because the sun loses force at certain times, the longest day of summer was in many religions an occasion for ceremonious rites connected with F. It was the belief of many anc. philosophers, as the Stoics, that the world would perish by F.: the Scandinavian mythology also mentions this belief, and the Apocrypha (2 Esdras xvi. 15). For further details as to folk-lore, etc., see ORDEAL, PARSEES, and ZOROASTRIANISM; for the physics and chemistry of F. see COMBUSTION, FLAME, and FUELS. See also C. F. Dupuis, *Origine de tous les cultes*, 1794; E. B. Tylor, *Researches in the Early History of Mankind*, 1865; Sir J. G. Frazer, *The Golden Bough*, 1890; J. A. G. Pauschmann, *Das Feuer und die Menschheit*, 1908; W. Hough, *Fire as an Agent in Human Culture*, 1926.

Fire Alarms, see under FIRE BRIGADES.

Firearms. In this article will be considered the varieties of F. known as small-arms, from their inception until their development into the modern sporting gun, rifle, and revolver; the latter are treated of elsewhere, as is also artillery. At the starting-point the gun is not distinguished from the cannon; in the early days of gunpowder portable F. were often

confounded with heavy artillery in Europe. The Flemings anticipated other nations in the use of hand F.; small hand cannons (Ger. *Knallbüschen*) were adopted at Perugia in 1364, and were used at the battle of Rosebecque in 1382. They were generally termed 'sclopo,' from which come 'sclopetto' and 'escopette,' and were used by cavalry as early as the end of the fifteenth century, as we find the expression 'eques scopetarius' used. The hand cannon of the fourteenth century was a rude weapon, made of wrought iron, and fastened to a piece of wood in such a manner that it could not be brought to the shoulder. The touchhole was at first made on the top of the cannon, with a cover to preserve it from damp, later it was placed to the right of the cannon. Two men were generally required to serve one of these hand cannons. The hand cannon capable of being fired from the shoulder, called in France a 'canon à main à épauler,' is of the same design as the former, but has a roughly-made stock; it dates from the end of the fourteenth century. Varieties of hand cannons in which the match was fastened to the weapon itself (hand cannons 'à serpentín' or 'à dragon' and hand culverins or petrials) were invented in the early fifteenth century. Hand cannons lengthened by an iron stock and supported by a kind of fork fixed on the pommel of the saddle were also used by cavalry.

The invention of the arquebus or harquebus marked the next stage in the progress of portable F. The novelty in this weapon was the appearance of a piece of machinery for firing the priming, an operation which had formerly always been carried out by hand. The touch-hole was pierced at the side of the barrel and above a small pan (bassinet). This pan contained the priming, and was covered by another hinged plate (couvre-bassinet). The match was grasped between the jaws of a nipping apparatus (serpentin), and was made to fall on the pan by pressing a trigger. Before the arquebus could be discharged the pan had to be uncovered, the match exactly adjusted, and made to burn more brightly, operations which took some considerable time. The barrel of the arquebus was longer than those of its forerunner, being over 3 ft. in length. The double arquebus was a F. which had two match-holders working in opposite directions; it was from 3 to 7 ft. long, and was generally used in the defence of ramparts. A stand on spikes or wheels, called a 'fourquine' was often used for its support. The wheeled or Ger. arquebus (*Radschloßbushe*) was the first F. fired without a match, and was further distinguished by having a wheel-lock. The match was superseded by the sulphurous pyrites, or marcassite, which was struck by the cogged wheel of the lock and fired the charge. The disk of the lock, which was of steel, was made to revolve rapidly by the pull of the trigger, so striking sparks from the pyrites on to the powder in the pan. This new weapon was not able to oust the arquebus, as its mechanism was much more complicated and liable to

get out of order, and the pyrites was very brittle, and easily broken off.

The construction and mechanism of the musket, which came into use soon after the arquebus, were precisely similar to those of the latter; it differed only in its calibre and charge, which were both double that of the arquebus. It could be used with either a wheel-lock or match, and its greater size necessitated at first the use of a 'fourquine' (see above). The wheel-lock gun continued in general use until about 1640, the pieces which produced the rotary motion being enclosed within cavities in the stock. In the latter half of the sixteenth century, an invention called the 'chenappan' (from Ger. *Schnapphaha*, a cock pecking), or, as it was corrupted, 'the snaphaunce,' proved to be the forerunner of the flint-lock gun. The change which the lock of the F. underwent by the invention of the flint-lock was very important, though not radical. By this contrivance a gun-cock held in its grasp the flint, which in its fall struck against a movable steel pan-cover. This fell back and left the priming powder in the pan exposed to the sparks generated by the impact of the flint on the cover; the main objection to this method was that the sparks from the flint did not always reach the priming powder. Sometimes, therefore, guns were made having both match locks and flint locks, combined in a method said to have been invented by the Frenchman, Marshal Vauban. The caliver, the fusil, and the musketoon were lighter varieties of musket; the carbine was a species of caliver with a short barrel but a large bore, whilst the blunderbuss had a still larger bore with a trumpet mouth, and discharged ten or twelve balls at a shot.

The flint-lock was superseded in the nineteenth century by the percussion-lock. In this lock the fall of a hammer upon a cap causes the ignition of the charge in the barrel of the gun. The cap is a small copper cylinder lined with a fulminating matter. Alexander Forsyth took out a patent for the percussion gun in 1807, but experiments on detonating materials had been carried out as early as 1699. The fulminates in the percussion cap are obtained from gold, silver, platinum, and chloride of potash. The pistol was at first the diminutive of a hand cannon, and as early as 1364 hand cannons of the length of a 'palma' (about 9 in.) were constructed. A little later came the petronal or petrial, a kind of short arquebus, which held a place midway between the arquebus and the pistol proper. The barrels of the early pistols were very short, and the stock was almost at right angles to the barrel. The later developments of F. belong to the articles mentioned below, but it is interesting to note that the principles of breech-loading rifling, and revolving chambers, both in guns and pistols, were discovered at very early times, long before they were utilised as of late years. For further details refer to ARTILLERY, CARTRIDGE, GUN, GUN-POWDER, HOTCHKISS GUN; HOWITZER; LEWIS GUN; MACHINE GUN; REVOLVERS;

RIFLE: etc. See Paul Lacombe, *Arms and Armour in Antiquity and the Middle Ages* (trans. by C. Boutell, 1874); A. Demmin, *Die Kriegswaffen*, 1891; F. Kelly and R. Schwabe, *Short History of Costume and Arms, 1066-1800*, 1931; H. C. Logan, *Hand Cannon to Automatic*, 1944.

Fireball, name of one or two kinds of fireworks, formerly used in war for illuminating or incendiary purposes. Of these the ground F. consisted of a sack filled with some brightly burning composition, and pierced with holes. A parachute F. was constructed in a similar manner, but was timed with a fuse and supported by a parachute. Both were fired from a mortar. They are now superseded by rockets (*q.v.*). The name F. is also applied to a certain class of comet, and also to a variety of globe lightning.

Firebote, term in law used to denote a tenant's right to cut wood for fuel from the land on which he is living. See **ESTOVERS**.

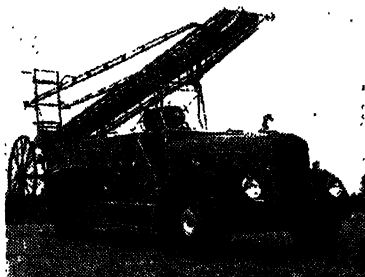
Firebrick, see **FIRECLAYS**.

Fire Brigades and Fire Fighting. Fire brigades are bodies of trained men and their equipment for fighting fires, and for saving life and property from loss and damage from fire, or any other causes. Under this heading will be treated the personnel and fire-fighting appliances throughout the Brit. Isles, but similar precautions for dealing with uncontrolled fire are taken in every tn. of size and importance throughout the world. The first reference to a fire brigade relates to China, c. 4000 B.C. In 2000 B.C. Egypt had an organisation for fighting fires, and the Romans started to form their brigades under a *praefectum vigillum*, or prefect of the watch, about 150 B.C., and by about 40 B.C. theirs was a highly trained and efficient brigade. In England there is no record of very early fire brigades, although legislation in 1189 encouraged the use of building materials of a more fire-resisting nature than hitherto. In 1212 also, it was decreed that new houses were not to be roofed with reeds, rushes, straw or stubble, and that water should be kept for fire-fighting purposes.

The first fire insurance office was founded in London in 1680—The Phoenix (not to be confused with the Phoenix which was founded a century later), and the first body of fire fighters was then organised. These men were drawn from the Thames watermen, and each insurance company dressed their men in distinctive livery. It is not known how they were equipped. In 1825 some of the rival companies realised the desirability of united effort, and later all the more memorable insurance offices merged their fire fighters in the formation of the London Fire Engine Estab. In 1832, later to become, by Act of Parliament in 1865, the Metropolitan Fire Brigade. Money was raised for the maintenance of this brigade by (i.) a halfpenny rate on the rateable property of London, (ii.) a contribution from the insurance companies

of £35 for every million pounds gross insured, and (iii.) a ten thousand pounds grant from the gov. In 1904 the title was changed to the 'London Fire Brigade' which, by 1938, had reached a strength of one chief officer, six senior officers and 2211 other officers and men. There were fifty-nine land fire stations and three R. Thames stations. In other important cities and tns. and throughout the country, most local authorities maintained brigades staffed by professionals or volunteers.

Organisation.—The first Fire Brigade Act for over 40 years was passed by Parliament in 1938. It required, among other things, that certain local authorities should make provision for the extinction of fires and the protection of life and property by providing fire brigades, making efficient arrangements for them to be called, and arrangements for mutual assistance between fire authorities. This Act had not



Dennis

SELF-PROPELLED PUMP, WITH ESCAPE

come into operation, however, before the first Air Raid Precautions Act, 1937, which required air raid precautions and fire schemes to be prepared, such schemes to include an emergency fire brigade service and the recruiting and training of auxiliary firemen. These schemes brought into being the Auxiliary Fire Service which consisted of volunteers from all walks of life who trained in their spare time as auxiliary firemen. At the outbreak of the Second World War in Sept. 1939, many thousands of part-time firemen had completed their initial training, and many of them entered their fire brigades on a full-time basis, while others continued with evening and night duties. The Auxiliary Firemen and their 'Regular' colleagues met and fought the great air raid attacks of 1940 and 1941. Owing to the widespread nature and severity of the Ger. air attack, however, the need for greater mobility and uniformity of practice and equipment was realised, and in Aug. 1941, all local authority fire brigades, 'regular' and 'auxiliary,' were united to form the National Fire Service. The

organisation within the National Fire Service enabled vast numbers of appliances and men to be mobilised at a moment's notice to any part of the country requiring assistance, with the advantage, *inter alia*, that all equipment, appliances, etc., were uniform and interchangeable, and it was this body which successfully met the varying forms of air attack from 1941 until the end of the war. A National Fire Service College was estab. where officers and prospective officers were given extensive training in all aspects of fire fighting and fire prevention. One of the important developments within the National Fire Service was the selection of certain suitable officers for specialised training over a long period in the subjects of fire prevention and fire protection, and these officers were available to give free advice to local authorities, schools, hospitals, factory managers and private householders.

As the result of a promise made by the home secretary that, after the war, local authorities might again control their own fire brigades, the Fire Services Act was passed in 1947 making co. councils and co. bor. councils the 'fire authorities' from April 1, 1948. The 1947 Act provides, that among other things, fire authorities shall secure:

1. Such a fire brigade and such equipment as may be necessary to meet efficiently all normal requirements;
2. The efficient training of members of the fire brigade;
3. Arrangements for dealing with calls;
4. Information, by inspection and otherwise, required for fire-fighting purposes, with respect to the character of buildings and other property;
5. Arrangements for mitigating damage to property resulting from measures taken in dealing with fires (*i.e.* salvage);
6. Arrangements for giving advice on fire prevention, fire protection and means of escape in case of fire.

Joint assistance schemes must be made between adjoining fire authorities' areas, so there is no question whatever of there being any boundaries from a fire point of view. The only boundaries are administrative ones. The secretary of state is the controlling authority, and a staff of H.M. inspectors are responsible for ensuring that effective and efficient fire brigades are maintained. Regulations made under the 1947 Act establish standardised ranks, rank markings, rates of pay, conditions of service, etc., throughout the country. The ranks in the fire brigade are now: Chief Officer, Assistant Chief Officer, Divisional Officer, Assistant Divisional Officer, Station Officer, Sub Officer, Leading Fireman, and Fireman. Training estab. are organised by the larger brigades where members of those brigades having no training centres may also receive initial and supplementary training. The National College gives advanced and specialised training to officers. Financially, the fire authorities bear 75 per cent of the cost of fire brigades, the remaining 25 per cent coming from the Treasury. The estimated cost of the first year of operation is £14,500,000.

Britain's account for fire damage in recent years is given in the following table:

YEAR.	LOSS.	LIVES LOST.
1938	£3,780,000	1563
1939	£9,088,000	1602
1940	£12,640,000	1868
1941	£10,254,000	1806
1942	£12,470,000	1601
1943	£9,092,000	1346
1944	£11,818,000	1332
1945	£12,800,000	1227
1946	£12,047,000	953
1947	£19,814,000	944
1948	£18,851,000	not pub.

These figures relate to material loss only, and take no account of consequential loss. Loss due to enemy action is not included. The growth of tns., the inflammability of certain building materials, and the use in industry of highly inflammable and complex chemicals, together with the increased importance of conserving foodstuffs and timber in co. dists., have rendered adequate fire protection essential. This has been made possible during recent years by the great advances made in the science of fire fighting, in the specialised knowledge of fire engineers, and in the increase in efficiency of mechanically propelled vehicles.

The earliest record of fire appliances is of a pump invented by Ctesibios, a Gk. living in Egypt, about 150 B.C. There is no direct record of it, but Hero of Alexandria described it in the same century. Later buckets, simple pumps, and squirts were used, although inventiveness in this direction seems to have been ignored, for at the time of the Great Fire of London in 1666, there were still only squirts and simple pumps available.

Pumps.—The first known appliance for delivering a *continuous* stream of water was described in 1675 when an air-chamber was coupled to a manual piston type pump. During the latter part of the nineteenth century, the manual type of fire engine was gradually replaced by a combination of horses and steam engines. The horses, specially trained, pulled to the scene of the fire a trolley upon which was a steam engine for pumping purposes. These engines were kept with fires banked down or ready for quick ignition, and were quickly brought to life so that a good head of steam was available by the time the engine had arrived at the fire. At the commencement of the twentieth century, the internal combustion engine began to replace the steam pump and the horses, and the design of the pumps themselves started to change from the reciprocating piston type to the centrifugal pump with its high output for small weight, and very high efficiency—important factors in fire appliances.

Present-day practice is the combination, as one unit, of the internal combustion engine and the centrifugal pump which, instead of working on the principle of displacement by pistons or plungers, makes use of the natural law known as centrifugal force, and consists of a revolving impeller which receives water at its

centre and which discharges it from the outer edge of the blades. The water is converted into the pressure energy required by the general construction of the pump casing. Pumping cannot be commenced until water is within the pump casing, and this is either obtained by introducing water into the pump under pressure (e.g. from a street main supply) or by 'lifting' water from an open supply by 'priming,' i.e. by reducing pressure within the pump and suction hose to below atmospheric pressure (14.7 lb. per sq. in.), thereby causing the atmospheric pressure on the surface of the open water supply to drive the water up the suction hose and into the pump to fill the vacuum created. Under absolute vacuum conditions a maximum 'lift' of 34 ft. is theoretically possible, but under the most favour-

purposes, but as a water tower from the top of which large quantities of water can be pumped on to a high, burning building.

Various other ladders for use in varying circumstances are carried on fire appliances, together with numerous items of 'small gear,' each piece having its own particular use.

Hose.—The original hose used in fire fighting was made of leather, riveted throughout its length. The excessive weight and its inflexibility confined the lengths to short pieces only. The first flexible hose was made in 1672 by J. van de Hyde, Snr., and J. van de Hyde, Jnr., by sewing together the edges of strips of leather. This was a great step forward. Modern hose is made of vegetable fibres woven in such a way as to withstand considerable internal pressures and rough



Merryweather

TURNTABLE LADDER

able working conditions the maximum possible 'lift' is 28-30 ft. See also PUMPS.

Fire 'Escapes' (Ladders).—In residential or factory areas the 'first attendance' to a fire usually includes an escape carrying appliance and the ladders, known as escapes, are designed to be used rapidly for rescue purposes up to a height of about 50 ft. Designs vary, but escapes consist generally of an extending ladder in three sections which are extended by means of steel cables from drums and winch handles, mounted on a sliding carriage enabling the elevation of the ladders to be varied as required. Very rapid and effective use is often made of this piece of equipment. With the increase in height of modern buildings came the need for firemen to get still higher with their apparatus and the escape was developed into the turntable ladder which, although similar in principle to the escape, is constructed normally of steel, power driven, and, as the name implies, is mounted on a turntable on the main vehicle, by which it can be rotated through a complete circle. By the simple operation of levers, the ladders may be manoeuvred into any position required within its range (up to 150 ft.). The turntable ladder is not only used for rescue

abrasions externally. The main fibres used are flax, jute, ramie, cotton, and hemp. Experiments have been made with synthetic fibres (rayon and nylon) though these, for one reason or another, have not yet been found entirely satisfactory. Hose is mainly of two types—'unlined,' which is the ordinary woven fibre, and 'lined,' which contained a very fine layer of rubber or latex covering the whole of the inside of the hose. The latter is the heavier to handle, but the smooth surface of the rubber greatly minimises the friction on the water, and also reduces the amount of water damage within buildings, for this type of hose does not leak as the 'unlined' type does. 'Unlined' hose is usually in 75 ft. or 100 ft. lengths and 'lined' in 50 ft. lengths, each length being capable of being coupled to any other by (usually) brass instantaneous couplings. The diameter of hose varies according to the use to which it will most likely be put, but the most common size for all normal fire fighting purposes is 2½ in. diameter. Fire appliances each carry 1000-2000 ft. of hose according to locality and need.

Fire Alarms (Street).—Most large built-up areas are equipped with an electric fire alarm system, with fire alarm posts situated at convenient positions in

the streets and roads, which connect direct to the fire station. The fire alarm is usually operated by breaking a glass panel and pulling a knob. This immediately makes electrical connection with the fire station where bells are automatically actuated, and the code number of the fire alarm which has been operated is punched out on a tape machine, together with the exact time. There are two main types of fire alarm—'open circuit,' where the actuation of a fire alarm box closes the electrical circuit, and the 'closed circuit' where actuation of a box breaks the electrical circuit, in each case causing the alarms to be given at the station. One disadvantage of most street fire alarm systems is that the person giving the alarm must wait at the post until the arrival of the brigade, and then direct them to the actual address of the fire. Modern development is overcoming this feature by enclosing a telephone in the alarm post so that the caller may speak to the fire station, and give necessary details of the address. It is questionable whether, in highly built-up areas, street fire alarm systems are now so essential as they were, for, with telephones so often readily available, and with emergency facilities, this latter method of calling the brigade is almost as quick as the street fire alarm system, with the advantage also that the full address of the fire can be given.

Fire Alarms (Automatic).—Automatic fire alarms within buildings are devices which automatically respond to any sudden rise in temp. or any gradual rise above a predetermined temp. within a room or compartment, and give an alarm of fire by ringing a bell either outside the building protected to call attention to passers-by, or in a fire station, or both. These automatic alarms work on one of the following principles: (a) thermostatic control, where a rise in temp. will expand a piece of metal situated in small containers fitted at intervals to the ceiling; (b) the expansion of a volatile liquid in a small diameter copper tube running round the walls at ceiling level; or (c) the expansion of lengths of wire situated at intervals on the walls causing a weight to drop. In each case the action causes an electric circuit to be completed for the operation of the alarm bell.

Automatic Sprinklers.—A sprinkler system within a building consists of a range of pipes fitted at ceiling level and connected to a pressure supply of water (e.g. tn. mains, overhead tank, pump from riv., etc.). On the range of pipes are situated at regular intervals sprinkler heads or outlets, having 1-in. diameter, which are sealed in such a manner that they are automatically opened at a predetermined temp. These sprinkler heads are fitted normally one for each 100 sq. ft. (i.e., at 10 ft. intervals) and the seal consists of a seating held in position by a special solder which melts, or by a small quartz bulb containing a volatile spirit which when expanding on being heated, shatters the bulb, thereby releasing the valve seating. The operating temp. may

be varied, and is normally at 155° F. The water issuing from the pipe impinges on a deflector which causes it to 'sprinkle' in umbrella shape over a floor area of approx. 100 sq. ft. In buildings which may become very cold in winter, e.g., riverside warehouses, with the possibility of water in a sprinkler system freezing, a special 'alternate' system may be installed whereby the pipes are charged in winter time with air under pressure, but with an automatic device for rapidly expelling the air and admitting the water in the event of fire. The value of the automatic sprinkler installation lies in its ability not only to detect a fire but also to confine it or extinguish it, and also to give warning by an alarm bell that it is in operation.

Adaptations of the sprinkler system have been made for use on oil fires where water at ordinary pressures would not be suitable for extinguishing burning oil. This adaptation causes water to be ejected on to the surface of the burning oil at high pressure, thereby creating a water-oil emulsion which will not burn readily. Further variations of the sprinkler system may be found outside of buildings which are separated from others only by a short distance. This variation, known as a 'drencher system,' is to create a water curtain down windows and other openings to prevent fire spreading from the nearby buildings. A similar device may be found in many theatres, where the purpose is to provide a cascade of water down the safety curtain to keep it from buckling and falling in the event of a fire on the stage. A system, not unlike the automatic sprinkler system in principle, is the automatic Carbon Dioxide (CO₂) installation which is used to extinguish fires involving oils, spirits, or electrical equipment. On the automatic opening of a valve at a predetermined temp., the room or chamber protected is flooded with carbon dioxide gas. One advantage of this system is that no water damage is caused to delicate electrical apparatus, and on the dispersal of the gas no damage has been caused to any unburned oil or spirits.

Fire Extinguishing Media.—To produce the phenomena of fire three factors are essential to combustion. They are: 1, the presence of a combustible material, or fuel; 2, the presence of air or oxygen to support the combustion; and 3, the attainment and maintenance of a minimum temp., according to the nature involved. If any one of these three essentials are removed then combustion will cease, and fire extinction consists of this action either by 1, removing the burning material (starvation of the fire of fuel); 2, reducing the available air or oxygen (smothering); or 3, reducing the burning material to a temp. below which it will not continue to ignite or re-ignite (cooling). Some methods of extinguishment involve more than one of the above.

Water is the most common extinguishing agent. In the first place, it is the cheapest and most readily available agent, but, secondly, and particularly, it is a

substance which will absorb most heat from a burning material and thereby reduce it below its ignition temp. This is due to the fact that water absorbs 85 calories per gram (153 B.Th.U. per lb.) on being heated from normal temp. to boiling point, but to convert boiling water to steam will absorb 540 calories per gram (973 B.Th.U. per lb.). It will be seen, therefore, that if water is to be used to best advantage it should be converted into steam by the burning material in order that the maximum possible heat is thereby absorbed, for it takes about six times as much heat to convert water to steam as it does to raise it to its boiling point. These figures, compared with those relating to other extinguishing media, show that water has a very much greater capacity of absorbing heat and consequent reduction of the temp. of the burning material to below its ignition temp. *Foam* is a chemically produced solution not unlike thick soap suds in appearance. Is used for the smothering (or excluding oxygen from) burning oils, spirits, fats, etc. Water on this type of fire would have the effect of spreading the burning material. *Carbon Dioxide* and *Methyl Bromide* are inert gases, heavier than air, both of which are used to having a smothering effect on burning materials. They have also some cooling properties, but limited compared with water. These extinguishing agents are particularly suitable for use on electrical apparatus, for they are non-conducting and non-damaging. Certain *dry powders* have been used for fire-fighting purposes. Generally these powders contain a large percentage of sodium bicarbonate, together with chalk, whiting, sand, etc., and for ordinary fires are no more effective than a bucket of water. Various methods are used to eject forcibly the powder on to the fire. Certain classes of fires, however, cannot be extinguished by water or liquid extinguishers, and dry powders of one kind or another only are possible, e.g. for fires involving magnesium, sodium, etc.

Fire Protection.—In recent years considerable emphasis has been placed on the specialised knowledge of fire prevention, and the protection of life and property against fire, as opposed to fire extinction, and there is in every fire brigade at least one specially trained officer who is available to give advice on these subjects. In principle, the aim of these specialists is to reduce the work of the fire fighter by, if possible, preventing fires, or if that is not possible, the danger of loss of life, to lessen and to minimise the spread of fire and thereby reduce the damage. These aims are carried into effect by the inspection of all types of property and the giving of free advice to the occupiers, on matters relating to building construction, means of escape in case of fire, fire prevention, water supplies, access for fire appliances, etc. (See also **FIRE-RESISTING BUILDINGS AND MATERIALS.**) The following is a summary of fire protection legislation concerning chiefly means of escape and public safety:

- 1, Public Health Act, 1936 (sections 59 and 60);
- 2, Factories Act, 1937 (sections 34, 36, and 37);
- 3, Celluloid and Cinematograph Film Act;
- 4, Cinematograph Act, 1909, and Regulations;
- 5, London Building Acts;
- 6, Miscellaneous Factory Orders and Regulations;
- 7, Regulations made under Education Act, 1944;
- 8, Children and Young Persons Act, 1933;
- 9, Theatres Act, 1943;
- 10, Local Acts, Orders, Regulations, and Byelaws;
- 11, Petroleum (Consolidation) Act, 1928, and Regulations;
- 12, Explosive Acts.

See R. Northwood, *Fire Extinguishing and Fire Alarm Systems*, 1928; A. N. Cameron, *Chemistry in Relation to Fire Risk and Fire Extinction*, 1933; *Chemical Fires* (revised), 1934; J. J. Williamson, *General Fire Hazards and Fire Protection*, 1935; J. H. Blood, *Technology of Fire Insurance*, 1935; J. Bowman, *Hydraulics for Fire Engineers*, 1936; *Manual of Firemanship: A survey of the Science of Fire-fighting* (H.M.S.O.), 1943 ff.; Building Research Committee and Department of Scientific and Industrial Research, *Fire Grading of Buildings* (H.M.S.O.), 1946; H. S. Hodges, *Electricity and Fire Risk*, 1947; J. W. Kenyon, *The Fourth Arm*, 1948; Sir A. Fibrebrace, *Fire Service Memories*, 1949.

Fireclays, are clays which will withstand a high degree of heat, without excessive shrinking or warping. The varieties of F. differ in their degrees of fusibility owing to the variations in the proportion of free and combined silicon; they are essentially hydrated aluminous silicates with lime and magnesia in the form of carbonates, iron pyrites, free silica, potash, and soda, with a percentage of water. No fixed standard of refractoriness can be given, but in all good F. the fusion point is over 1600° C. Such materials as ganister, sand, sawdust, etc., are mixed up with F. before burning to ensure the 'body' of the brick being sufficiently open in character. Ordinary fireclays are used for making bricks, crucibles, chimney-pipes, etc., but when special properties are required in the bricks, such materials as lime, *bauxite*, etc., are added. Fireclay is found in conjunction with coal at Stourbridge, Glasgow, Newcastle-on-Tyne, and many other places in the British Isles. It is also found in Germany, France, Belgium, the U.S.A., etc.; the beds do not as a rule exceed 2 ft. in thickness. The Stourbridge F. are world-famous, and widely exported.

Firedamp, the name applied by miners to methane (CH₄), *q.v.* It comes from the crevices in the mines, being formed in the coal, and when mixed with the air in a certain proportion is highly explosive, causing many accidents. See **COAL-MINING**.

Fire Engines, Escapes, etc., see under FIRE BRIGADES.

Fire-extinguishing Compounds, see FIRE BRIGADES—*Fire Extinguishing, Media.*

Firefighting, see FIRE BRIGADES and FIREFIGHTING.

Firefly, name given to the luminous beetles belonging to the Lampyridæ and the Elateridæ. The former family include the true glow-worm (*q.v.*), the Eng. species being *Lampyrus noctiluca*. Little is known as to the light given by the Lampyridæ, but most entomologists agree that it has a sexual significance; in the *Luciola*, F. of S. Europe, this brilliance is almost entirely confined to the male. To the Elateridæ belong the genus *Pyrophorus*, tropical Amer. beetles, some of whom possess remarkable luminosity; *P. noctiluca* has a yellowish eye-like lamp on each side of the thorax, and another on the ventral surface of the abdomen. These beetles are used by the natives as lanterns, and the women ornament their hair with them.

Fire Insurance, see under INSURANCE.

Firelock, see FIREARMS.

Firenze, see FLORENCE.

Firenzuola, Agnolo (1493-c. 1545), It. author, b. at Florence. He at first entered the legal profession after having been a student of the law at Perugia and Siena, and practised in Rome, where he was the friend of Aretino. It is said that he joined the order of monks at Vallombrosa, and after the death of Pope Clement VII. he became abbot of Prato. Among his works are: *Discorsi degli animali*; *I Lucidi*; *La Trinzia*; and a *trans.* of the *Golden Ass* of Apuleius. His works were first collected and pub. by P. L. Fantini in 1802. See life by M. Olivieri, 1935.

Fire of London, see GREAT FIRE OF LONDON.

Fire-raising, term used in Scots law for what is known in Eng. law as arson. It applies to the setting fire wilfully to someone else's property, such as burning ships, buildings, growing wood, or corn, coal or articles of that sort. The law with regard to this also forbids setting fire to one's own or other people's property with the intention of defrauding the Insurance Company, and these offences are punished in Scotland with penal servitude.

Fire Resisting Buildings and Materials. The purpose of erecting fire resisting buildings is to give greater safety to life and property by providing safe exit for occupants, reducing outbreaks of fire and minimising fire spread. This is achieved largely by the use of building materials which are not only incombustible but which will not readily transmit heat. They must also withstand rapid cooling during fire fighting. Those building materials which offer the most resistance to fire are solid clay bricks, stone, concrete. Steel is incombustible but, if exposed to heat will (a) expand and cause damage to the structure, and (b) lose much of its structural strength at temps. reached in moderate fires. Cast iron will 'resist' fire but may collapse suddenly on being cooled. These

latter two materials should be well clad with concrete or other non-heat conducting and incombustible material.

Considerable progress has been made in recent years in the classification of building materials and elements of structure into various grades of fire resistance following subjection to comprehensive standard tests. This work is carried out jointly by the Department of Scientific and Industrial Research and the Fire Offices' Committee. As a result, architects, builders and others, having determined the degree of resistance required for their particular purpose, may select materials and forms of construction falling within certain specified grades ranging from $\frac{1}{2}$ hr. to 6 hrs. resistance to fire spread. Wall boards or building boards used for internal work are also graded according to combustibility, but some of these materials, although, in themselves comparatively incombustible, have the character of spreading flame rapidly across their surface. Large buildings sub-divided by internal fire resisting walls must have door and window openings protected to be effective. The Fire Offices' Committee issue rules relating to the construction and fitting of fire resisting doors, etc. These, to be completely effective, should be self closing and held open only by a fusible link which will melt at a predetermined temp.—thus allowing the door to close.

Timber of the hardwood type (*e.g.* oak, teak) 2 in. thick gives a good degree of fire resistance for doors. Other timber with a large cross-sectional area may withstand fire for a considerable time before failing, and may be more reliable than unprotected steelwork. Woodwork may be given treatment by impregnation with certain ammonium salts or painted with a mixture of sodium silicate and china clay. This produces a 'flame retardant' effect rather than make the timber fire-resisting. Fabrics, draperies, etc., used on the stage in theatres are usually required by the Licensing Authorities to be dipped or sprayed with various solutions for the same purpose. These solutions often contain boric acid, borax and sodium phosphate.

The London Co. Council make stringent regulations relating to fire protection in certain classes of buildings.

Fire-ships, vessels filled with combustible materials for the purpose of bringing destruction on the enemy. The 'fire-chamber' was built between the decks from bulkhead to forecabin and filled with various combustible materials, among them gun-powder. These were then set on fire and sent among the enemy, the men escaping in boats. They were employed to defend Antwerp in the siege of 1585, and in 1588 to destroy some of the ships of the Armada. In more modern times Lord Dundonald used them against the Fr. in 1809, but after that they were very little used. Certain kinds of floating fire were, however, used much earlier than any of these, some being mentioned by Livy as being used in the second century B.C.

Fire Tactics have undergone considerable modifications since the first intro-

duction of firearms in warfare; the increased range and efficiency of the arms of infantry and artillery have naturally made many changes. The method of delivering fire which was originally used by the Spaniards for infantry was for each man in succession to fire, and then to fall to the rear of the line to reload. This required a great degree of coolness and individual skill to be successfully carried out. As the handiness of the musket was improved file firing became more and more irregular, and by the middle of the seventeenth century it was the usual custom for the musketeers to fire one or two 'volleys,' or 'salves,' and then charge. Until the Prussian era musketry methods were still half-hearted, and the lack of effectiveness of the infantry, may be put down to the fact that 'fire' and 'movement' were distinct, as their fire was reserved until as near the enemy as possible. The 'linear' system consisted of two long lines of battalions, giving the utmost scope for fire, as it was considered that the maximum weight of controlled fire at short range was a decisive factor. The Prussian system of fire discipline was originated by Leopold of Dessau and Frederick Wm. I., and put into operation by Frederick the Great. Under this system a battalion consisted of eight companies, which fired company volleys as follows. As the company on the extreme right commenced to fire, the second company was at the ready, and so on; the same process was gone through on the left flank, so that by the time the centre companies had fired the end companies were again ready. Since that time rifles have become efficacious at over 1000 yds., and the finding of the range has become a matter of importance. The fire of an infantry company is controlled by the non-commissioned officers and officers, who name the target and give the range. Firing by volleys is the usual method; save at short ranges independent fire and magazine fire are rarely adopted. The most important modification of rifle fire has been the adoption of rapid fire in 'bursts' as the normal method for infantry instead of slow continuous fire. Three rounds per minute is the rate for slow fire, and from eight to twelve rounds for rapid aimed fire. Machine-gun tactics are still somewhat indefinite, but one or two principles of action stand out clearly. It is important that whether they are used in numbers, or as auxiliaries, they should be free to move without being under the necessity of maintaining a relative position to some other unit. Machine-guns must also co-operate with other troops as closely as possible, and must be able to be concealed and evade the enemy's shrapnel. As the result of experience in the First World War, machine-gun companies are now attached to regular infantry battalions. The most favourable range for machine-gun fire is from 600 to 1400 yds. The same principle of firing in bursts is observed. As regards guns which come in the category of artillery, four methods of firing are used. When each gun is fired

separately at a signal from the commander of the battery, this independent fire is used to find the range, etc. When guns fire at stated intervals all along the line of the battery; this is known as battery fire. If the guns of each section are fired at the will of the commander thereof with no reference to the rest of the battery, this is known as section fire. Firing by salvos is when all the guns fire simultaneously; this is only employed very rarely, as sometimes for salutes, etc. These principles, however, have but little relation to massed attacks by tanks, preceded by very mobile troops on motor cycles and parachutists operating well behind the opposing lines and armed with sub-machine guns—co-operating with dive-bombing planes and other low-flying planes armed with machine guns. These tactics were employed by the Gers. with overwhelming success against the armies and powers of Holland, Belgium, and France in May-June 1940 and very speedily resulted in the complete defeat of all three countries. In the later years of the War the Allies developed these tactics by armoured formations and aircraft with devastating results against the Wehrmacht.

Fire-watching, see under AIR-RAID PRECAUTIONS.

Fireworks, see PYROTECHNICS.

Firmament, name applied to the vault of Heaven, the Vulgate trans. *Arma-mentum* being the rendering of the Septuagint *stereoma*, the idea in Heb. being that of something stretched out. The F. was originally looked upon as a solid sphere, which revolved and carried with it the stars which were fixed to it—also forming the div. between the 'waters above the firmament' and those below it. This led later on to the Ptolemaic system of astronomy in which there were supposed to be a number of spheres revolving one outside another.

Firmān, or Firmaun, term applied to a decree issued by the sultan. Any minister can sign such a decree, but a special one has to make it effective by placing on it the name of the sultan in a monogram. The term also signifies a passport which is granted by the sultan or a pasha.

Firmont, De, see EDGEWORTH, HENRY ESSEX.

Firozpur, or Ferozepore, dist. and tn. of the E. Punjab, India. The former has an area of 4302 sq. m., and its surface is level and fertile, wheat, barley, millet, cotton, tobacco, and oil-seeds being produced. The tn. of F. is the civil headquarters, and a military cantonment. It is situated about 3 m. from the l. b. of the R. Sutlej, and contains an arsenal. Pop. of dist. 965,000, and tn. 55,000.

Firozshahr, vil. in the dist. of Firozpur, W. Punjab, Pakistan. It was the scene of a battle which took place in 1845, when the Brit. under Sir Hugh Gough and Sir Henry Hardinge defeated the Sikhs.

First Aid, term used for assistance given immediately in cases of accident or sudden illness before medical advice can be obtained. A knowledge of a few simple rules about stopping bleeding, etc., is often

the means of saving life. Lessons in F. A. methods and principles are given to both men and women by the St. John Ambulance Association (St. John's Gate, Clerkenwell, London, E.C.), the Brit. Red Cross Society (14, Grosvenor Crescent, London, S.W.), and St. Andrew's Ambulance Association (a Scottish organisation), and Boy Scouts and Girl Guides organisations. See ANTIDOTES, BANDAGES, BLEEDING, BRUISES, BURNS AND SCALDS, CHOKING, CONCUSSION OF THE BRAIN, CONVULSIONS, DISLOCATION, DROWNING, EPILEPSY, EYE, FAINTING, FIT, FRACTURE, HYSTERIA, POISON, SHOCK, SPRAIN, SUNSTROKE.

First Empire, that of Napoleon I. who was created Emperor of the Fr. by a decree of the Senate on May 18, 1804. The Empire lasted until the restoration of the Bourbons in 1814.

First-Fruits, first profits of any office, property, etc., as e.g. in feudal tenure, the year's profit of the land after the death of the tenant, which was payable to the king; and in ecclesiastical law, the first year's income of a benefice. When the papal power was dominant, each new incumbent had to remit to the papal treasury the first year's revenues (*primitiæ*) of his benefice. Valuations of annates were made in England in the thirteenth century and probably originated about that time. At the Reformation the F.-F. enacted by Henry VIII. in England were the annates of the bishoprics which he had secured from the Papacy. Their valuation was recorded in the *Liber Regis* in 1535 and became the basis of the valuation of the Eng. clergy thereafter. In Queen Anne's reign, these annates were given up to a fund for augmenting poor livings.

First of June, Battle of the. The name given to the naval victory of Lord Howe over the Fr. which was fought off Ushant and terminated on June 1, 1794. This was the first occasion on which the Fr. naval strength in the Channel had been encountered in the Napoleonic Wars, and the victory was important in its results both in destroying Fr. naval activity in the Channel and in depriving them of a large quantity of grain which was under convoy from America. The number of ships on either side was about equal, and the fight was hotly contested; but though it is always referred to as the 'glorious' First of June, no remarkable evidence of naval skill was given. The result, however, was decisive, for the Fr. admiral lost seven ships, and 3000 men, and was compelled to seek refuge in Brest.

First Offenders Act, 1887. This Act was passed to permit the conditional release of first offenders in certain cases. It gave power to any court before whom a person was convicted of larceny or false pretences or any offence punishable with not more than two years' imprisonment to release the prisoner upon probation of good conduct instead of sentencing him to imprisonment, provided it were shown that there was no previous conviction against him. Not every first offender was entitled to such consideration; the Act expressly limiting its operation to cases

where the youth, character, and antecedents of the offender or the trivial nature of the offence, or other extenuating circumstances, justified the release on probation. This Act was repealed by the Probation of Offenders Act, 1907, because it was thought that the earlier Act gave to a court of record no powers beyond what it already possessed at common law. The Act of 1907 extended probation to the case of any person convicted on indictment and added to the extenuating circumstance those of health and mental condition. Where it released the offender it was only on condition that he entered into a recognisance, with or without sureties, to come up for sentence if called upon within three years and to be of good behaviour. The court might also order him to pay the costs of the proceedings and compensation for any loss sustained. A parent or guardian of an offender under sixteen might also be ordered to pay such compensation and costs. A court of summary jurisdiction had analogous powers under the Act. The Criminal Justices Act, 1925, extended the system adopted by the above Acts, by making provision for the appointment of probation officers and probation committees for petty sessional divs. The Act of 1907 was repealed by the Criminal Justice Act, 1948, which amends the whole law relating to the probation of offenders (for fuller details, see under CRIMINAL LAW).

First Republic, proclaimed in France on Sept. 21, 1792, by the National Gov., following the downfall of the Bourbons in the Fr. Revolution. The Convention was succeeded by the Directory (q.v.) in 1795 and by the Consulate in 1799. The Republic ended with the estab. of the First Empire (q.v.).

Firth (Icelandic *firðir*, Eng. *frith*), Scottish name applied to a narrow arm of the sea, e.g. Firth Bay, a shallow inlet 6 m. from Kirkwall, etc. It is frequently a riv. estuary, as the firth of Forth and the firth of Clyde.

Firth, Sir Charles Harding (1857-1936) Eng. historian, b. at Sheffield. F. was lecturer at Pembroke College, 1887-93; Ford's lecturer in Eng. hist. in the Univ. of Oxford, 1900; fellow of All Souls (1901), of the Brit. Academy (1903), of Oriel (1904). In 1904 he was appointed regius prof. of modern hist. at Oxford. His works include: *Scotland and the Commonwealth* (1895), *Journal of Joachim Hane* (1896), *Scotland and the Protectorate* (1899), *Oliver Cromwell* . . . (1900), *Cromwell's Army* . . . (1901), *Naval Songs and Ballads* (1907), *The House of Lords during the Civil War* (1910), eds. of lives of Col. Hutchinson (1885), and the duke of Newcastle (1886), Ludlow's *Memoirs* (1894), and *The Clarke Papers, 1891-1901*. He also contributed to the *Dict. of Nat. Biog.*

Firth, Mark (1819-80), philanthropist and steel manufacturer, was a native of Sheffield. In 1843 he estab. in Sheffield his own steelworks, which grew rapidly in size and importance, and where eventually most of the steel ordnance came to be manufactured. As a philanthropist he

figures as the donor of a park (opened in 1875), Firth College (founded in 1879), and almshouses, all of which gifts were bestowed on Sheffield.

Fiso, see **FISCUS**.

Fiscal, see **PROCURATOR FISCAL**.

Fiscal Reform, see **TARIFF REFORM**.

Fischart Johann, known as **Mentzer** (Mainzer) (c. 1545–c. 1591), Ger. satirist, a native either of Strasburg or Mainz, and seems to have been a student at Worms. He took the degree of doctor of the Univ. of Basle about 1572, and after travelling in France and England went to Strasburg about 1576, and in 1581 became advocate to the imperial court at Speyer. After his marriage he became magistrate or bailiff at Forbach, near Saarbrücken (1583). His works, the greater number of which were written between 1575 and 1581, are many of them clever satires directed against the pope, the Jesuits, the aristocracy, and all sorts of folly. They are mainly based on the model of Rabelais, but at the same time are characterised by a true originality. In addition to these satires there are many works which are purely humorous, and which assure to him one of the highest places among Ger. humorists. He was also a master of his own language, which fact is exemplified very clearly in his trans. of the *Gargantua* of Rabelais. He also wrote a number of other works, though the authenticity of some of the works attributed to him has not been estab. Among his satires are: *Aller Praktik Grossmutter* (1572), *Affentuerliche Geschichtschrift von Gargantua und Pantagruel* (1575), *Podagrammisch Trostbüchlein* (1577), and *Bienenkorb des heiligen römischen Imenschwarms* (1579) while *Flöhhalz* (1573) and *Weiber Tratz* (1573) are among his humorous work. He also wrote *Das glückhafte Schiff von Zürich* (1576). See lives by C. H. W. Wacknerhagl, 1870, and A. Hauffen, 1921–22.

Fischer, Emil Hermann (1852–1919), Ger. organic chemist, b. at Euskirchen. Studied at Bonn and Strasburg and, after some years as assistant to von Bayer in Munich, became prof. of chemistry, first at Erlangen and then at Würzburg. Later he succeeded von Hoffmann as prof. of chemistry at Berlin, and during his tenure the school flourished so that students came to it from all parts of the world. He became famous for the preparation in conjunction with Julius Tüfel of synthetic sugars and from these of the ferments and enzymes. His work on proteins was, however, his principal achievement. His other researches included the analysis of the constitution of the rosaniline dyestuffs; investigation of uric acid; and the preparation of purin and its derivatives. The value of his work in organic chemistry was recognised in most countries: in 1890 he was awarded the Davy Medal of the Royal Society; and in 1902 the Nobel prize for chemistry.

Fischer, Ernest Kuno Berthold (1824–1907), Ger. philosopher, b. at Sandewalde, Silesia, and was a student at Leipzig and Halle univs. He became a lecturer at Heidelberg, and in 1856 prof. of phil-

osophy at Jena until 1872, when he succeeded Zeller at Heidelberg. His chief work is *Geschichte der neuern Philosophie* (1854–1910). He also wrote: *System der Logik und Metaphysik oder Wissenschaftslehre* (1852–1909), *Franz Bacon und seine Nachfolger* (later ed., 1875), *Benedikt Spinozas Leben und Charakter* (1865), *Anti-Trendelenburg* (1870) and *Goethe Schriften* (1888–1904). See studies by E. Traumann, 1907 and E. Hoffmann, 1924.

Fischer, Hans (1881–1945), Ger. chemist, b. at Hoechst. He was educated at Lausanne, Marburg, and München, and later held various professional appointments in Vienna, Innsbruck, and Munich. In 1930 he received the Nobel prize in chem. for his work on the red colouring matter in blood.

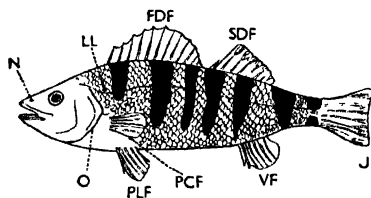
Fischer, Johann Georg von (1816–97), Ger. poet and dramatist, b. at Gross-Sussen, Württemberg. He studied literature and botany at Tübingen, in 1846 being appointed prof. at the Stuttgart Oberrealschule. His first vol. of poems was pub. in 1854, and his last, *Mit Achtzig Jahren*, in 1896. He also wrote some dramas, among the best known being *Saul* (1862), and *Kaiser Marimilian von Mexico* (1868).

Fischer, Otakar (1883–1933), Czech poet and critic, b. in Kohn. He studied Ger. literature at Prague and Berlin, becoming prof. of Ger. literature at Prague Univ. His poetry, expressing the struggle of the soul with fate, is marked by a simplicity of expression, especially in his later work. His poetic trans. combine scholarship and style: his largest work was a fifteen-vol. ed. of Goethe, and in addition he trans. works from Fr., Sp., and Eng. F. was also a literary historian and critic of distinction, producing monographs on Kleist (1912), Nietzsche (1913), and Heine (1924). His critical work is collected in *Duch a Slovo* (1927), and *Staro a svét* (1938). See V. Jirát and others, *Dilo Otakara Fischera*, 1933.

Fischer-Tropsch Process, system of synthesising hydrocarbon waxes and oils from hydrogen and carbon-monoxide. It was invented in Germany by Franz Fischer and Hans Tropsch in 1925 and under the pressure of war preparation was developed intensively to produce liquid fuels. During the Second World War nine plants produced a total ann. output of 500,000 tons of synthetic oil. In this process coal is converted into a gas mixture by high-temp. treatment. After purification it is subjected to a catalytic treatment in which 80 per cent of the gases is converted to the required products, generally the fine hydrocarbons and straight-chain paraffin. The compressed gas may be used as a raw material for chemical production or as a portable fuel. The motor spirit, provided it is reformed or combined with high-grade fuel, is suitable for petrol engines. Diesel oil of very high quality is another product; the wax is suitable for polishes, etc., by further treatment of the primary products, detergents, soap, fats, and lubricating oils may be produced.

Fiscus, or **Fisc** (Lat. *fiscus*, a basket or money-bag), was in the time of the Romans the name applied to the emperor's treasury to distinguish it from the *erarium*, or state treasury, and later on designated the public money which he had by virtue of his office. This is the modern sense of the word, the word *erarium* having been discontinued for a long period.

Fish (O.E. *asc*, Dutch *visch*, Lat. *piscis*), class of vertebrates which live under water, breathe through gills, and whose limbs are modified into fins. There are four orders: the Elasmobranchs, the Ganoids, the Dipnoi, and the Teleosteans. The Elasmobranchs, or cartilaginous F., were very numerous in prehistoric times, but are now only represented by such F. as skates, rays, sharks, and dog-fish. The



EXTERNAL FEATURES OF A TELEOSTEAN, OR BONY FISH (THE PERCH)

N, nostril; LL, lateral line; FDF, first dorsal fin; SDF, second dorsal fin; J, caudal fin; VF, ventral (or anal) fin; PCF, one of the two pectoral fins; PLF, one of the two pelvic fins; O, operculum (gill cover).

Ganoids, or armoured F., are nearly extinct. The members of this order are the sturgeon and bony pike, the Polypterid and the Amla. The Dipnoi, or lung-fish, consist of three groups: the *Protopterus*, the *Lepidosiren*, and the *Ceratodus* (*Epiceratodus forsteri*) found in W. Africa, the Amazon R., and Queensland respectively; related to these are various fossil forms and one present-day genus (*Latimeria*), the latter known from a single specimen discovered off the W. coast of Africa in 1939. The Teleosteans, the newest of the four orders, include nearly all modern F. They possess a bony vertebral column, a brain and dorsal nerve cord, branchial clefts communicating with gills; they are covered with scales and have two paired fins without fin-rays, and unpaired fins and a tail, with fin-rays. The Elasmobranchs have few eggs and are often viviparous, but the majority of other F. have very numerous eggs. The sight of F. is keen, but owing to the nature of the element in which they move, the range of vision is probably very limited. Although their hearing apparatus does not appear to be as complete as that of animals of a higher grade, they possess this sense to a remarkable degree. The sense of smell is also acute and the olfactory nerves are usually of large size; they also possess a

special sensory system located in the lateral line. Although some F. appear to feed upon vegetable substances, by far the largest number are carnivorous, the preying of one species upon another being nature's method of preserving the balance between them. It appears to be almost necessary that this should be so, as, for example, a single cod can lay as many as 4,000,000 or 5,000,000 eggs. The eggs of the fish form the hard roe: two elongated oval lobes, one on each side of the body, placed between the ribs and the intestinal canal; the eggs of the sturgeon are known as caviare. Apparently when the female has deposited her eggs she takes little further interest in them and it is the male who does any tending or guarding that must be done. The testes of the male fish are the soft roe. The air bladder functions as a float or hydrostatic organ. Of recent years much interest has been taken in the F. that inhabit the very deep seas, and some interesting light has been thrown upon them. The long-doubted kraken or octopus of huge dimensions has apparently now taken a settled place in the world of natural hist. It is contended that he is but one of many of the denizens of the ocean able to live at great depths of which we have little knowledge. Below a certain depth the F. appear in many cases to have the power of creating their own light, being equipped with luminous organs. The purpose of this self-made lamp is not clearly known, and whether it constitutes a sex call, or is a warning to enemies, or a lure for prey is still a subject of surmise. The colouring of F. is of remarkable variety, and, in some cases, of great beauty. Generally speaking it seems to be of a protective nature, assisting the F. to camouflage themselves (like 'mimetic' insects), wherever they may be, by close resemblance to their surroundings. Thus along the muddy floors of the sea the flat-fish shows the brown upper surface that is indistinguishable from the ground on which it rests, F. dwelling in the duller waters are brown and dull leaden in hue, while those that float upon the currents or near the surface, have the green and blue markings suggestive of the waves. Very beautiful and rich colours are found in those that move near to the bright vegetation, and strangely enough in some that dwell in the very deep seas, although in the latter cases they resemble autumn hues rather than the gay tints of summer. Many kinds of F. are gregarious and keep together in shoals and schools. A curious variation of this fondness for company lies in the fact that sailing ships at sea are sometimes followed for amazing distances by F. that have picked them up en route.

The fish was a symbol of Christ in early Christianity, for the first letters of the titles of Christ in Gk. (*Ἰησοῦς Χριστός Θεοῦ Υἱός* *Σωτήρ*, i.e. Jesus Christ, Son of God, Saviour) make up the word *ΙΧΘΥΣ* (fish.)

See also **FLAT-FISH**, **FISHERIES**, **PISCICULTURE**. See J. R. Norman, *A History of Fishes* (3rd ed.), 1947.

Fish Curing, term used to describe methods of preserving fish intended for

distant markets or for consumption at a later period. This is usually done by salting, drying, or smoking. Of recent years the improved facilities of carriage and the use of refrigeration have made it unnecessary for fish to be cured for marketing in many cases where it was once essential; but against this, the enterprise of merchants in various parts of the world has built up a demand in remote areas where previously little trade was done. The two chief varieties of fish thus treated are herrings and cod. The latter of these are usually dried, either split or treated whole. The fish curers of Iceland are especially well known for their skill in preserving cod, which enables it to be sent to very remote areas. Herring-curing is usually done by salting, the pickle being little more than the natural salt of the sea brine. A large demand exists for smoked herrings, and great care is taken in selecting the right kind of wood to be used for this purpose, as the flavour is very easily affected by the nature of the smoking. Around the Brit. seaboard many endeavours have been made to deal with the problems arising from the occasional unexpected glut of herrings, and, where suitable warehouse accommodation exists, and a local pop. prepared to join in 'rush jobs' is available as in some places on the Northumberland coast, large quantities of herrings are frequently cured with remarkable speed.

Fish, Royal. In Eng. law, certain fish (whales, sturgeons, porpoises, etc.), when taken in territorial waters, belong to the Crown or its grantees, though caught by another person.

Fisher, Andrew (1862-1928). Australian statesman; b. at Kilmarnock, Ayrshire Scotland; son of Robert F. Worked in a coal-mine, and went to Queensland in 1885. Elected to Queensland legislature in 1893; minister of railways in Dawson administration. In 1901 entered Commonwealth Parliament as Labour member for Wide Bay. Joined Watson Labour Cabinet, 1904, as minister of trade and customs. Leader of party from 1907. In 1908 Prime Minister for six months. In 1910 back in power. Privy Counsellor 1911. Gov. fell, 1913; but he returned to power Aug. 1914. Resigned 1915 and became high commissioner in London; where retiring 1921, he d. Oct. 22.

Fisher, Geoffrey Francis (b. 1887). Eng. schoolmaster and churchman, son of the Rev. H. F. rector of Higham-on-Hill, Nuneaton. Educated Marlborough College, and Exeter College, Oxford. Liddon studentship, 1910. At Wells Theological College, 1911. Assistant master, Marlborough College, 1911-14; headmaster of Repton School, 1914-32, bishop of Chester, 1932-39; of London, 1939-45, dean of the Chapels Royal, 1939-45. Elected archbishop of Canterbury in succession to Wm. Temple, on Jan. 22, 1945, and enthroned April 19.

Fisher, Herbert Albert Laurens (1866-1940), Brit. scholar, parliamentarian, and historian; b. in London, eldest son of H. W. F. Educated at Winchester; New College Oxford; Paris; and Göttingen.

Fellow of Brit. Academy, 1907. Delivered S. African lectures, 1908; Lowell lectures, Boston, Massachusetts, 1909 and 1924; Chichele lecturer in modern hist., Oxford, 1911-12. Member of royal commission on public services of India, 1912-15; of gov. committee on alleged Ger. outrages, 1915; vice-chancellor of Sheffield Univ., 1912-18. His metallurgical and general scientific ability, combined with his academic gifts, brought him to the notice of Mr. Lloyd George and, after being elected Liberal M.P. for the Hallamshire Div. of Sheffield (1916), he was appointed president of the board of education, and in that capacity he served until the fall of Lloyd George's second Coalition Gov. In 1922. From 1918 to 1926 he took his seat in the Commons as National Liberal member for the Eng. Univs. As president of the board of education he was responsible for the far-reaching Education Act of 1918, which was framed 'with a view to the establishment of a national system of public education available for all persons capable of profiting thereby.' The Act embraced nursery schools, elementary, secondary, and continuation schools, and 'further' education and teaching of univ. standard. F. also initiated an admirable scheme of teachers' superannuation, and introduced the block system of grants in elementary education. He left a lasting memorial in his masterly *History of Europe* (3 vols. 1925), a work which gives him a place among the great historians of England. Of his other works the more important are *The Medieval Empire* (1898); *Studies in Napoleonic Statesmanship* (1903), significant for its account of the emperor's reorganisation of Germany; *The Political History of England, 1485-1558* (1906); and *Bonapartism* (1908). Other works: *Life of F. W. Mailland* (1910); *The Republican Tradition in Europe* (1911); *Political Unions* (1911); *Napoleon Bonaparte* (1913); *Studies in History and Politics* (1920); *An International Experiment* (1921); *The Common Weal* (1924); *Life of Lord Bryce* (1926); *Life of Sir Paul Vinogradoff* (1927); *Whig Historians* (1928); *The Bay Colony* (1930); *England and Europe* (1938); and *An Unfinished Autobiography* (1940). F. was great in his conception and wide vision of life and great in the representation of those things for which the people of this country fought in two world wars—the emancipation of the mind and a ceaseless spirit of inquiry.

Fisher, John (c. 1459-1535), bishop of Rochester, a native of Beverley Yorkshire, educated at Cambridge, becoming master of Michaelhouse College in 1497. He was appointed by the countess of Richmond, mother of Henry VII., as her confessor, and in 1504 became chancellor of Cambridge Univ. and bishop of Rochester. He was a staunch supporter of the new learning and also of the authority of the Church, which made him a vigorous opponent of Henry VIII.'s divorce from Catherine of Aragon. For this reason, and on account of the pope making him a cardinal, he was accused of treason and beheaded by the king's orders.

Fisher of Kilverstone, Sir John Arbuthnot Fisher, first Baron (1841-1920), Brit. admiral; b. on the Wavenden estate, Ceylon; son of Capt. Wm. F., 78th Highlanders. Entered the navy in 1854, and served in the Crimean war of 1855, and the China war of 1859-60; took part in capture of Canton and Peh-ho forts. In 1882, as commander of the *Inflexible*, he was present at the bombardment of Alexandria. He became director of naval ordnance, 1886, and served as such until 1891. Thereafter he received steady promotion, holding a number of commands, and was First Sea Lord of Admiralty from 1904 until 1910. He was ennobled in 1909. During his term as First Sea Lord he introduced many reforms, including that of the nucleus crew, which rendered a peacetime navy rapidly available for war; the elimination of obsolete ships; and the substitution of the Dreadnought type. He will go down in hist. as the man who, in 1910, predicted the date of the war with Germany and shaped his policy accordingly. Under many govts. he laboured and planned with extraordinary success to provide an adequate fleet, and when the First World War broke out the Grand Fleet was in readiness to sail to the right location and thwart the enemy, which it did by going, at the psychological moment and without delay, to its different war stations in the mouth of the Elbe and at the entrance of the Channel. The authority for the statement that F. predicted the date of the war is Lord Hankey, who states that it was at Kilverstone that F. foretold the approximate date, and said that Jellicoe would command the fleet when the war came. Regardless of the predilections of others, he made promotions with this end in view.

He retired from the Admiralty in Jan. 1910, after a long quarrel with Adm. Lord Charles Beresford, who had been in charge of the Channel fleet, and who brought charges of parsimony against the Admiralty, which a committee of the Cabinet found to be unsustainable. F. also retired from the navy in 1911. In 1912 he was president of the royal commission on oil fuel and engines, and it was through the researches of this body that in 1913 the Admiralty launched the first oil-fired battleships of the *Queen Elizabeth* class and that the first light Brit. cruisers (*Arethusa* class) to burn oil fuel were on the point of being commissioned when the war commenced. The *Arethusa* class certainly proved its value in the war, notably in the action off the bight of Helligoland. F., however, wanted to go further, and instal the internal combustion engine in ships which should offer a mark of some 33 per cent less area than any 5000-ton vessel theretofore built and be able to circumnavigate the globe without refuelling. But sound as the idea was, the time was not ripe for so great a change in construction. When the war commenced F. had been in retirement since the age of seventy, though after that age he continued to exercise a very real influence on naval policy, and in parti-

cular his advice was sought by the gov. and followed in the handling of the Agadir incident (q.v.). When, through prejudice and popular clamour, the marquess of Milford Haven (q.v.) was driven to resign office, F. succeeded him as First Lord, and at once commissioned some 600 vessels of all classes, and in many cases of new design, to be completed by the early part of 1915. His ambitious plans, however, for the use of these ships were frustrated by the Dardanelles expedition, which was diametrically opposed to his naval policy of striking at the heart of Germany by a landing force, covered by the navy, on the coast of Pomerania. When he saw that ships were being gradually withdrawn from the North Sea forces to supply the needs of the Mediterranean forces, so that (in his opinion) Brit. control of the sea was in jeopardy, he tendered his resignation, and retired immediately after the Coalition Gov. came into office. But this did not mark the actual end of his services, although no adequate sphere for his great energies and amazing prevision was thereafter open to him in naval affairs. But his work in organising the Board of Invention and Research, a purely advisory body, which work he rendered on recall in 1915, was highly effective. He appears to have spoken in the House of Lords on two occasions only, and then only on matters arising out of the Dardanelles expedition. Laconic in the extreme, the first speech, following the resignation of Mr. Churchill from the Cabinet in Nov. 1915, was by way of retort to Mr. Churchill's accusation that the First Sea Lord had not given clear guidance or firm support over the Dardanelles question. Possibly the accusation was justified, for F.'s heart was never in the expedition, but in his reply he said that, having rendered sixty-one years of service, he was content 'to leave his record in the hands of his countrymen,' and that it was not in the national interest to make aspersions when the country was in the midst of a great war. The second speech was in March 1917, and was to much the same effect. Although thus laconic in debate, he was, especially as he grew old, garrulous and flowery in discussion and correspondence. Whatever his faults of impulsiveness and sailor-like bluntness—as exemplified by his famous phrase 'Sack the lot'—he was essentially the great organiser and administrator who created the modern Brit. Fleet and whose uncanny strategic prevision secured its efficiency and readiness for war. In July 1918 his wife d. Thenceforth he resided almost entirely with the duke of Hamilton's family. In 1919 he pub. two very characteristic books—*Records*, and *Memories*. From these the reader gets the impression that Cutcliffe Hyne's Captain Kettle was drawn, in part at least, from F. He d., after undergoing three operations, at 10 St. James's Square, London, July 10, and was buried in Westminster Abbey. His brother, Sir Frederic Wm. F. (1851-1943) was also a naval officer. Served in the Mediterranean, 1887-91; in Australian service from 1894 to 1898. Promoted

admiral 1907. President of the Royal Naval College, Greenwich.

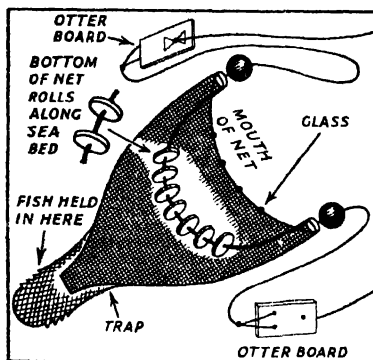
Fisher, Sir (Norman Fenwick) Warren (1879-1948). Brit. civil servant and public administrator, educated at Winchester and Hertford College, Oxford. Entered the civil service by open competition, 1903, and was appointed to the Inland Revenue Dept. He was one of those chosen by Sir Robert Morant to assist in organising the scheme of the National Health Insurance Act, 1911, his marked ability in this work bringing him under the notice of Mr. Lloyd George. In 1913 he was made a commissioner of inland revenue, and in 1914 he was deputy chairman and in 1918 chairman, of the board. On the retirement of Sir John (later Lord) Bradbury, he was appointed to the great office of permanent secretary to the Treasury, being singled out by Mr. Lloyd George as the right man to introduce progressive methods in the organisation of the civil service. F. at once recast the Treasury estab. by placing the three chief branches, finance, supplies, and estab. under separate controllers ranking as heads of first-class gov. depts., with direct access to the chancellor of the Exchequer. The permanent secretary, thus freed from much departmental routine, was formally recognised as 'head of the civil service'—a style that did not pass without a strong challenge in the Commons and outside the House. But as such he was entrusted with the duty of advising the Prime Minister on matters of common interest to the service, including especially the appointment of permanent heads of depts.—a reform which secured for a time an approach to a unified service in the higher ranks. At the same time F. also initiated other important reforms in administration, notably the estab. of the principle that the permanent head of a dept. should himself act as its accounting officer, and answer for his charge to the public accounts committee. The re-constituted Treasury, however, did not endure for more than fifteen years, and the departmental work he had diverted to the sev. controllers returned to the permanent secretary, though F. in that capacity retained the special advisory powers he had originally secured. He retired in 1939, but on the outbreak of war occupied the post of N.W. regional commissioner. In 1940 he became a special commissioner for London, with the duty of supervising the restoration of roads and public utility services after bombing, but retired from public life in 1942.

Fisheries, Ministry of Agriculture and, see FISHERIES.

Fisheries: 1. *River and Lake Fisheries.* are regarded in England as centres of sport and recreation. They are generally the right of the owner of the soil over which the water flows, and in the hands of private owners. It is divided into several and common fishery. A several fishery is the exclusive property of the owner of the soil and can only be transferred by deed; should the right be unclaimed the public acquire no title by right of custom. If

the course of a riv. is diverted, the late owner has no claim to the new channel, though with the encroachment of the riv. he simultaneously becomes entitled to the rights of fishery. The owner has the right to all the fish he can take, and is not restricted in the use of machinery if that machinery does not disturb the navigation. He cannot put up an obstruction to fish above or below the part under his control, neither may he use dynamite or any other explosive, nor pollute the riv. in any way. Common fishery is fishery which all persons may enjoy. The Crown has no right of fishery in non-tidal waters on a subject's property. The control of fresh-water F. is in the hands of dist. boards appointed by co. councils which regulate the by-laws and licences and fix the close time for the protection of fishing. There are special laws for salmon and fresh-water fishing. The prin. fresh-water fish are carp, barbel, tench, roach, bream, trout, salmon, and chub, but they are not considered of nearly so fine a flavour as sea fishes. The most important lake fishery in the world is the Great Lakes fishery in the U.S.A., from which great quantities of food fish are obtained, including whitefish, trout, pike, and perch. Huge quantities of fish are obtained from the Mississippi R. The rivs. of Russia are well stocked with food fish, and carp, bream, lampreys, and sturgeon are extensively caught in the Ural and Volga rivs.

2. *Sea Fisheries.*—The capture of fish as a food for man seems to have been carried on from very early times. Cave remains in W. Europe afford evidence of the use of many different kinds of implements for fishing and of the capture of a considerable variety of species, even including the whale. Dried and salted fish was an important article of commerce among auct. peoples, and many great maritime cities, both auct. and modern, had their origin in fishing vils. A herring fishery is known to have been estab. off the Eng. coast by the eighth century, and a little later the Brit. fishing industry had extended all over the North Sea up to the Arctic regions. The industry was greatly assisted by the growth of Christianity, since the demand for fish for fasts, enjoined by the Church, was considerable. In this country the Reformation dealt a severe blow to the F., and the Brit. supremacy in this direction was not regained till after the Napoleonic wars, having been held in the meantime by the Dutch. During the latter part of the nineteenth century the fishing industry throughout the civilised world received a great impetus from the introduction of steam. This first showed itself in the increased market for fish rendered possible by railway transit, and later spread to the methods of fishing themselves. Steam drifters and trawlers are now largely used, and by these means, and the introduction of ice as a preservative, fresh fish is sold at great distances inland. The regulation of the fishing industry has also been found necessary, as many of the best grounds were becoming worked out owing to indiscriminate methods. A scientific study



Odham's Press

OTTER TRAWL-NET

Fish enter through the wide mouth, and are trapped once they pass through the narrow funnel into the bag.

of the protection and cultivation of various breeds of fish is hoped to do much towards restocking exhausted dists. and keeping up the supply in others.

Methods of Fishing.—The numerous modes in which fish are captured all fall under three main heads: fishing by lines, nets, or traps. Fishing with a hooked line is of three varieties, known as the hand line, the small line, and the long line. Fishing by hand line is largely carried on off the E. and S. coasts of England for cod and whiting. It is only possible in shallow water near land, and the lines are single and bear one or more hooks. As each fish is caught the line is drawn up and the hooks rebaited.

Small-line fishing is the prin. method employed in the Scottish haddock industry. It is carried on by small boats, known as yaws, within 2 or 3 m. of land. The lines range about 2000 fathoms, and are usually baited on land by the wives and children of the fishermen. Mussels form the usual bait, but limpets, scallops, cockles, lugworms, and crabs are also used. The hooks are attached to snoods about 4 ft. apart, and the line, when ready, is coiled into a creel, the baited hooks all lying in the centre, and fresh grass scattered over them to keep the bait fresh. When the fishing ground is reached the lines, all fastened together, end to end, are run out over a metal cylinder. The ends are kept down by large stones, to which are also attached lines reaching to the surface, and there fastened to a buoyed flagstaff, weighted so as to float upright and mark the position. The line is shot across the tide, and is left at the bottom for from half an hour to an hour. Plaice, codlings, whittings, dabs, flounders, and gurnets are also caught by this method, though haddocks form the chief haul.

Long- or great-line fishing, also known

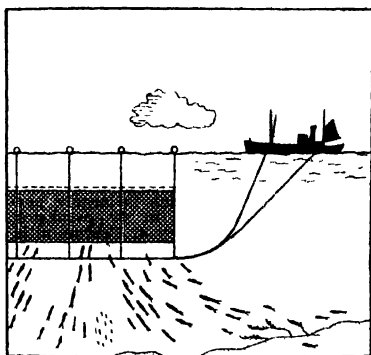
as boulder or trot fishing, follows the same principle as small-line fishing, but employs longer and stronger lines and larger hooks. It is largely used in the North Sea, by both Eng. and Scottish fishermen, at a considerable distance from land for the capture of large fish, such as cod, ling, coalfish, halibut, skate, rays, turbot, conger, and hake. Off the Scottish coast this mode of fishing is generally carried on by the herring boats, and herrings are used as bait. Off the Eng. coast large vessels with a sea-water well are used, in which the fish are kept alive. The Eng. long line is often about 8 m. long when shot, and carries over 4000 hooks; squid, whelks, herrings, and lampreys are used as bait. Steam vessels are now employed in long-line fishing, and are usually provided with an ice-chamber for storage. The Scottish North Sea long-line fishing is carried on mainly from March to July, and extends as far N. as Iceland. It requires deep water of over 200 fathoms. It is also worked during the winter over the Dogger Bank and Cromer Knoll. Boulter ('spiller' in Devonshire and Cornwall) is the term usually applied to the long line used off the S. coast of England, which is not so long as the North Sea type, and is worked from smaller open boats.

Fishing by line has sev. advantages over the use of nets. The fish secured by a line are less bruised and injured, and thus preserve their freshness better. Also, long lines can be shot over rough rocky ground and in mid water, where trawling, etc., is impossible. Many species of fish may be secured by either method, but some, such as congers, seem to be only caught by lines, and others, such as soles, only by nets.

Fishing by nets is of many different varieties. Of these the most important is trawling, by which most of the fish for the Brit. market is secured. Trawling is an industry which has been altogether developed during the last century. First used in the S.W. of England, it was introduced to Ramsgate in 1815, Harwich in 1828, Hull in 1844, and Grimsby in 1858. Steam trawlers made their appearance in 1879, and have largely increased in number, being faster and more seaworthy, and having a much larger fishing capacity than the sailing vessels. Trawlers work for the most part in about 40 ft. of water, though the operation is possible, at a greater labour, in 70 ft., and a smooth and level bottom is essential. The sailing vessels register from 30 to 100 tons, being larger off the E. coast than the S.W., and are either cutter- or ketch-rigged, the latter rig being the safer and more economical. The steam trawlers are about 130 ft. long. The North Sea, off the E. coast of England, is the great trawling ground, and large numbers of boats are owned by Hull, Grimsby, Yarmouth, Lowestoft, and Ramsgate. In winter they work on the Dogger Bank, and each vessel stores its own fish in ice and carries it in; while in summer the fleets work farther afield, off the coasts of Denmark, Holland, and Germany, and deliver up

their hauls to a steam-carrier. The S.W. coast trawlers work independently from Brixham and Plymouth, and fish near those ports in winter and S. of Wolf Rock, or off the N. coast of Cornwall, in summer. Some trawling is done by steam tugs from Falmouth and Cardiff. Another trawling ground lies off the N.W. coast of England, and is worked by boats from Tenby, Whitehaven, Fleetwood, Blackpool, Southport, and Liverpool. The Scottish trawlers are almost all steamboats, and work outside the firth of Forth, off the coast of Aberdeenshire, and in the Moray Firth, the vessels coming from Granton, Leith, and Aberdeen. A large fleet of Irish trawlers, with Dublin as their headquarters, fish between the Irish coast and the Isle of Man. Trawls are of two kinds, the beam and the otter, the latter being the newer and better. The beam trawl is a large conical bag-shaped net, with a wide mouth kept open by a beam of wood, which has iron runners at its ends. The lower edge of the net is weighted, and the whole apparatus is dragged by the boat over the sea bottom, thus enclosing the low-swimming fishes in a kind of bag formed by the hind end of the net. The net is often 80 ft. long and the beam measures from 18 to 50 ft. The net is kept extended by a stout foot-rope, and a ground rope surrs up the fishes. The net is brought on board by means of a warp of strong steel wire attached to the bridle-ropes, and the haul is emptied at the cod end, i.e. that furthest from the beam. In the case of the otter trawl, the single heavy beam is replaced by two boards which automatically come apart when the trawl is let down and come together when it is hauled in, thus rendering the latter operation much easier. The boards are often weighted with iron plates, and only one edge rests on the ground, while a direct pull on the trawl is obtained by the use of from 6 to 12 ft. of chain between them and the bridle. A simpler form of the otter trawl is used by lt. and Sp. fishermen. The labour involved in trawling is very considerable, since the hauling of a heavy trawl on board takes at least an hour, and the expense caused by damage done to the nets by obstacles on the sea-floor is often heavy. Almost every kind of fish is caught in greater or smaller numbers by the trawl, though ground-feeding species predominate. Flat fish always form a large proportion of the haul, which includes sole, plaice, ray, conger, red mullet, dory, mackerel, bass, turbot, brill, halibut, cod, haddock, hake, gurnard, and ling.

The drift-net forms one of the most scientific methods of fishing, depending as it does on knowledge of the habits of certain kinds of fish and observation of their whereabouts at certain times. The net is set up in the water, being kept in a vertical position by weighting the lower end and buoying the upper with cork, wood, or glass floats, and is allowed to drift with the tide or current in such a way that it is at right angles to the direction which it is being taken by a school or shoal of fish. The fish are caught by the gills,



DRIFT-NET

Herring, mackerel, and fish that swim nearer the surface are caught by drifters which drag a series of nets between them. The net is kept close to the surface by floats: the fish are caught by their gills.

which become entangled in the netting. The nets, which are long and straight, may be used at the surface, as is most commonly the case, or at different depths, by means of weights and buoys. Fishing by drift-net is carried on off Cornwall for pilchard, with nets 40 fathoms by 4, having 40 meshes to the yard, for mackerel, with nets 20 fathoms by 16, with 28 meshes to the yard, and for herrings, with nets 40 fathoms by 41, with 36 meshes to the yard; off the E. coast and the Scottish shores for herring, with nets 30 fathoms by 9; and at the E. end of the Channel for mackerel. Ground fish, such as cod and turbot, are also caught by sunk drift nets. The fishing is carried on in Cornwall from about five in the afternoon till eight or nine in the evening, this being the time when shoals of pilchard and such fish spread out, all the fish heading away from the land. Each boat shoots a fleet of nets, numbering from sixteen to twenty for pilchard and herring, and eighty for mackerel, to windward of itself, and boat and net drift together, the former being kept head to wind by a small mizzen sail. A large number of boats can fish on the same ground, drifting parallel, without the nets becoming entangled. When the nets are hauled in, the fish are torn from the meshes and thrown on deck. Trawling and drift-net fishing have been seriously hampered on some parts of the Brit. coast, notably the coast of Devon and Cornwall, by sunken wreckage, resulting from the submarine destruction of shipping during the First World War. Great damage is suffered by the nets, which are frequently torn by projections and wrecks which have spoilt some of the best trawling grounds on the S. coast.

Another method of fishing with nets is by the use of seines or seans. These are long nets, weighted below and buoyed

above, which are dragged around a shoal, the fish being then brought in them either to the shore or the boat. In its simplest form seining is carried on from shore. One end of the net is fixed on the beach, the rest of the net is taken on board a boat and dropped over the stern as the boat makes a semicircle. When the vessel again reaches shore the net is brought in by means of the two ends being drawn together either by man-, horse-, or steam-power. A level bottom is necessary for this operation, which is largely performed on sand-banks, in riv. estuaries, as in the sand-eel fishery at Teignmouth. A more complicated type of seining is that carried on at St. Ives for pilchards during the late summer and autumn. This involves the use of a seine-boat, 32 ft. long, and manned by six rowers, and two men to work the net, two boats with the stop net, and a fourth boat, known as the lurker, from which directions are issued. The seine measures 160 fathoms by 6 or 8 ft., and the stop-net is 70 or 80 fathoms long. The pilchard fishery is protected by very stringent regulations, and has some interesting customs in connection with it, such as the employment of huers, who signal the approach of shoals from look-out stations. A variation of the seine is the purse-seine, used in deep water for mackerel, which has a rope run through the bottom, so that it can be drawn up into a large bag, which encloses the fish. Purse-seines are 900 to 1500 ft. long, and 160 to 180 ft. deep, and are set by large rowing boats accompanying the seine-boat.

The trammel is an ingenious arrangement consisting of three walls of netting, set alongside each other, of which the middle one has a much smaller mesh and is set much more loosely and slackly than the two outer ones. The nets are set up and down the tide, and a fish, striking through the large mesh of one of the outer nets into the small-meshed centre one, carries this with it through the large mesh of the third net, and is thus imprisoned in a bag of the small meshed and slack middle net. A trammel is usually 40 to 50 fathoms long and 1 to 1½ fathoms deep, with the two outer nets of a 12-in. mesh, and the inner one of a 2½-in. mesh. Red mullet, bass, and lobsters are largely caught by this means, particularly off the Cornish coast.

There are numerous minor varieties of nets. The fyke net is a long cylindrical bag kept open by hoops, which terminates in a pocket entered by a funnel-shaped opening, through which the fish will not return. Long straight nets, termed leaders, extend from the mouth to direct the fish towards it. The fyke net is set in fairly deep water, at the bottom. The pound net has a long straight leader, running out from shore to a bag-like net from which the fish cannot escape. Fish swimming along the shore come against the leader, and in attempting to swim round it, follow it down to the enclosure at the end. Pound nets are set in rather shallow water and are supported by stakes. Another type is the Lancashire

stake net, a long straight net 900 ft. long and 3 ft. wide, which is stretched across the tide on stakes. The fish, mostly plaice, are entangled in its meshes, and taken out when the tide goes down. Plaice are also caught in the hedge-baulk, which is a net set between long wicker walls. The stow, or bag net, is used in the Thames estuary, the Solent, the Lynn estuary, Boston Deep, and the frith of Forth. It is a kind of moored beam-trawl, being a large funnel-shaped bag 60 yds. long, and having an opening 20 to 30 ft. square. The fishing is from an anchored boat, and the flowing or ebbing tide carries the fish into the mouth, which is kept open by wooden spars. Sprats, herrings, and other small fish are caught in this way. The ground or set net works on the same principle as the drift net, but is anchored upright on the sea bottom. Herring, cod, turbot, and skate are captured by this means. Oysters are caught by a dredge resembling a beam-trawl, with the netting made of iron rings and the beam of iron also.

Traps are only used for crabs and lobsters. In the most common pattern a framework of wicker or wood is covered with netting. A bait is placed inside, and the opening is so arranged as to prevent the escape of the crab, etc., when once inside.

In recent years experiments have been carried out with a ring-net, in conjunction with an echo-sounder, a device based on radar (*q.v.*). Originally an aid to navigation, the echo-sounder sends an electrical impulse from the ship to the ocean-bed. The time taken for the echo to return to the ship is measured, and the depth of water or configuration of the ocean bed can be recorded as a picture. It was observed that the instrument would record any comparatively solid body between the bottom and the surface, such as a dense grouping of fish. Having located the shoal the boat steams in a circle, paying out the ring-net as it goes. The haul is brought aboard after the fish have been completely ringed. The element of uncertainty which always exists in fishing is thereby likely to be dispelled, as the fisherman will cast his nets where the fish are virtually seen. Another recent contribution of science to fishing has been in the field of stimulating plant growth in the beds of sea lochs in Scotland by means of putting phosphate in the water. Experiment has shown that the quantity of fish inhabiting the waters has increased and thereby the catches.

Regulation of Fisheries.—The control of the F. of Great Britain was, from 1839 to 1903, vested in the F. dept. of the Board of Trade. In 1903 these functions were transferred to the Board of Agriculture and Fisheries, now the Ministry of Agriculture and Fisheries. There is a separate Fishery Board for Scotland, which was instituted in 1882. It may be of interest briefly to consider the hist. of the administration of Brit. sea-F. The first effort to obtain definite and authoritative information on the state of sea F. was made by the royal commission

of 1860, which consisted of Mr. John Caird, Prof. Huxley, and Mr. G. Shaw-Lefevre. This reported in 1866 that the sources of supply gave reason for no uneasiness, and that fishing by all means should be allowed unrestricted freedom. The recommendations of the committee were included in the Sea Fisheries Act of 1868. Another royal commission in 1878 made an inquiry into the effect of the use of beam trawls and ground seines upon fish spawn and fry. A royal commission in 1883 for inquiry into the damage done to line and net fishing by the use of the trawl resulted in the estab. of fishery statistics (1885-87). The foundation in 1884 of the Marine Biological Association of the United Kingdom, which receives a gov. grant, has done much to assist the scientific study of marine biology. The Sea Fisheries Regulation Acts of 1888-1894 provided for the estab. of local committees with powers for the regulation of coast F. In 1899 the control of Irish F. was vested in the Dept. of Agriculture and Technical Instruction for Ireland. Some valuable recommendations were made in 1902 by the committee on ichthyological research, appointed by the Board of Trade, and further suggestions were made by a departmental treasury committee in 1907 all urging the con-

tinuation and extension of scientific research on subjects connected with the F. The regulation of gov. aid to such investigations is now in the hands of the development commission, which was appointed under the Development and Road Improvement Funds Acts of 1909 and 1910, and makes advances for the development of F. as well as agriculture, etc.

The right of fishing in Brit. territorial waters belongs solely to Brit. subjects, and can only be claimed by foreigners by convention. This right strictly belongs to the Crown, but the royal right is only claimed in certain cases, e.g. whales, sturgeons, porpoises, and grampuses are royal fish, and Crown property by whomsoever they are caught, and salmon, oyster, and mussel F. are still held by the Crown. On the high seas, outside territorial waters, the right of fishing is open to all, but may be regulated by custom or convention. Such conventions were made between Great Britain and the U.S.A. in 1818, 1872, and, as a result of the Behring Sea arbitration, in 1892; between Great Britain and France in 1839 and 1867, and between the countries having a North Sea seaboard in 1882.

Statistics of British Fisheries.—During 1937 the quantities of sea-fish landed in Great Britain, excluding salmon, were:

TONNAGE AND VALUE OF FISH LANDED OF BRITISH TAKING, 1938

Kind of Fish	England and Wales		Scotland		Total	
	Tons	Value (£)	Tons	Value (£)	Tons	Value (£)
Cod	322,320	4,239,308	27,387	506,998	349,707	4,746,306
Haddock	91,661	1,696,184	51,258	1,035,244	142,919	2,731,428
Halibut	31,968	1,184,420	1,715	59,447	33,683	1,243,867
Plaice	23,072	1,188,726	3,519	174,808	26,591	1,363,534
Skate and rays .	17,186	412,915	4,215	71,061	21,401	483,976
Whiting	13,470	202,499	16,037	272,592	29,507	475,091
Herrings	129,330	804,082	140,031	1,062,981	269,361	1,867,063
Mackerel	6,893	84,732	3,164	19,306	10,057	104,038
Other	140,735	2,420,343	21,702	624,234	162,437	3,044,577
Total	776,635	12,233,209	269,028	3,826,671	1,045,663	16,059,880
Shell-fish	—	408,637	—	79,853	—	488,490
Grand total . . .	—	12,641,846	—	3,906,524	—	16,548,370

In 1947 the quantity of fish of Brit. taking landed in England and Wales was 694,687 tons, valued at £31,004,924, against 776,635 tons, valued at £12,233,209 in 1938.

The number of fishermen (1931) in England and Wales was 26,945, with 18,472 in Scotland. In 1946 there were, in Great Britain, 36,801 regular and 4215 occasional fishermen: total 41,016.

In addition to this harvest of Brit. taking, the United Kingdom imports large quantities of fish. The figures for 1937 were as follows:

From Deep Sea F.	1,275,000 cwt. valued at £1,000,000
„ Brit. countries (chiefly Eire, Canada, and Newfoundland)	480,000 „ „ „ £1,900,000
„ Foreign countries	3,500,000 „ „ „ £10,000,000

Re-exports were:

To Brit. countries (chiefly Eire, Canada, and Newfoundland)	281,000 cwt. valued at £800,000
Foreign countries	220,000 „ „ „ £860,000

**QUANTITIES AND VALUE OF IMPORTS OF FISH INTO THE
UNITED KINGDOM FOR THE YEARS 1938 AND 1948**

	Quantities		Value	
	1938	1948	1938	1948
	Cwt.	Cwt.	£	£
Fresh, chilled, or frozen fish, other than fresh shell-fish:				
From Eire	22,070	77,897	124,627	547,541
Canada	68,928	1	285,862	9
Other Brit. countries	24,097	4,475	119,896	63,864
Norway	227,221	1,145,583	497,460	2,379,060
Iceland	122,041	258,450	172,295	1,414,168
Denmark (including Faeroe Is.)	329,795	387,288	687,078	2,301,066
Netherlands	29,088	27,550	97,993	176,997
Belgium	20,329	56,549	79,489	282,296
Deep Sea Fisheries	371,660	2,299,031	426,019	5,563,074
Total:				
Cod (fresh, chilled, or frozen)	222,223	1,305,796	160,393	3,296,876
Haddock	136,923	472,105	150,636	1,417,814
Herrings	386,989	694,638	170,449	769,208
Plaice	349,164	709,597	798,449	3,383,514
Salmon (including grilse) and trout	124,869	42,329	624,249	864,268
All other sorts	415,214	1,047,208	883,034	3,216,967
Total	1,635,382	4,271,673	2,787,210	12,948,647
Wet salted, split	259,094	92,687	167,183	284,253
Shell-fish, fresh, for food (not canned)	172,482	128,291	290,951	411,721
Fish, cured or salted, not canned (including shell-fish), canned:	108,139	10,603	166,747	41,055
Breling	36,471	17,963	246,838	311,108
Crabs and lobsters	97,438	1,347	853,797	58,122
Pilchards	59,231	3,214	101,990	16,122
Salmon:				
From Canada	155,679	56,314	772,299	576,248
Other Brit. countries	37	1,535	123	11,820
U.S.A.	299,373	7,076	1,158,489	51,704
Other foreign countries	696,740	29,972	2,685,108	393,215
Total	1,151,829	94,897	4,616,019	1,032,987
Sardines	107,387	156,097	449,358	1,831,141
All other sorts:				
From Union of S. Africa	1,830	68,768	11,313	796,517
Other Brit. countries	1,458	20,206	8,705	152,743
Norway	37,448	72,907	155,857	1,148,908
U.S.A.	13,811	437	118,950	4,044
Other foreign countries	35,831	67,074	120,246	509,143
Total	90,378	229,392	416,071	2,611,355

The statistics show that there was a great decline of imports in 1938, and that while in 1945-46 there were large increases the average totals did not equal those of 1937. From deep-sea F. the monthly average in 1938 was 31,000 cwt., valued at £25,500; in 1945 the average was 225,000 cwt. at £276,000, and for 1946 227,000 cwt. at £283,000. From Brit. countries overseas the monthly average in 1938 was 9500 cwt. at £44,000; in 1945 38,200 cwt. valued at £185,100; and in 1946 17,145 cwt., valued at £97,400. In 1938 imports of herrings, salmon, and migratory trout, cod, haddocks, plaice, etc., averaged 136,000 cwt., valued at £232,000; in 1945 the average was over 300,000 cwt., valued at £1,091,000; in 1946 the average dropped again being 215,000 cwt. at £770,000. Imports of salmon from Canada, U.S.A., Russia, and other foreign countries averaged 96,000 cwt. a month in 1938, valued at £385,000; in 1945 the

average was about 36,400 cwt., valued at £269,500; and in 1946 76,000 cwt. at £573,000. Statistics, in fact, will be found to show violent fluctuations (see Accounts relating to Trade and Navigation of the United Kingdom. H.M.S.O. (issued monthly)).

Detailed statistics of imports and exports of fish into and from the United Kingdom for the years 1938 and 1948 are subjoined.

QUANTITIES AND VALUE OF EXPORTS OF FISH FROM THE UNITED KINGDOM

	Quantities		Value	
	1938	1948	1938	1948
	Cwt.	Cwt.	£	£
Fish, fresh or frozen:				
Herrings	796,911	587,065	382,486	993,881
All other sorts	279,097	21,748	460,933	114,290
Fish, cured or salted, not canned:				
Herrings:				
To Brit. countries	60,712	87,224	94,290	337,081
Poland	864,695	38,355	556,846	98,313
Germany	969,988	584,366	704,299	1,218,356
Other foreign countries	838,207	269,602	670,996	871,070
Tota.	2,733,602	979,547	2,026,431	2,525,420
All other sorts	468,443	110,945	603,338	620,531
Fish (including shell-fish) canned:				
Herrings	59,152	87,733	166,900	574,552
Other sorts (including fish paste)	38,665	18,586	221,241	304,826

The British Fishing Fleet.—In 1937 the Brit. fishing fleet consisted of 13,352 vessels, with a tonnage of 273,855 (3,954 sailing, 11,482 tons; 9398 steam and motor, 262,373 tons).

The estimated number of men and boys employed in sea fishing in that year was 64,776, of whom 48,690 were regular fishermen, and the remainder persons occasionally employed in sea fishing.

Of Eng. F., the trawl F. for cod, haddock, and flat fish yield about three-fourths of the total amount landed, the remaining quarter being mainly supplied by drift-net F. for herring and mackerel. In Scotland net-F. for herring, etc., yield rather more than half of the total, trawling nearly three-eighths, and line F. an eighth. In Ireland three-fourths of the total is provided by mackerel and herring F., and the remaining quarter by trawling. The fishing industry of the Brit. Isles far exceeds that of any other European country in all respects. Returns as to steam trawlers show that while Brit. vessels are more and more leaving the North Sea and going farther afield, their place is taken by continental vessels. Great Britain is responsible for more than a third of the total haul of the F. of Europe.

Fish thrown back.—From time to time the public is shocked by reports of quantities of fish being deliberately thrown back into the sea. Is such action to be denounced as wicked, or excused as inevitable? The process by which supply is adjusted to demand is in general ruled

by self-interest and the price mechanism—a smaller supply tending to raise price and a bigger supply to reduce it. But the price mechanism does not work smoothly and promptly enough to cope with the day-to-day variations in supply in the fishing industry, and a bumper catch may reduce the price to ruinous levels. Storage is often at least part of the answer to irregularities of supply, but fish is pre-eminently a perishable commodity, and storage has to be combined with methods of preservation—curing, canning, freezing. Even so the fishing industry often finds itself faced with the alternative of assisting the price mechanism by reducing the effective supply, or of selling at a figure which leaves less than no profit—and the fisherman is not able to indulge in altruism.

While we may perhaps excuse the fisherman who jettisons his fish in the case of unexpected glut we can only regard such frustration of the bounty of nature as a *pis aller* not to be tolerated outside the strictest limits. In these days the price mechanism is giving ground to planning, and planning certainly offers possibilities for the beneficial disposal of surpluses.

American Fisheries.—United States.—The F. of the U.S.A. are very important and increasing in prosperity year by year. They employ 190,000 men; in vessels and boats valued at over \$300,000,000, of which 26 per cent consists of steam trawlers; and land 1,300,000 tons of fish a year valued at over \$100,000,000.

Though many Amer. boats fish in the waters off Canada, Newfoundland, etc., by far the larger part of the total catch comes from Amer. waters. The Atlantic F., particularly those of the middle Atlantic states, are considerably more profitable than those carried on off the Pacific seaboard. The most valuable product is the oyster, nearly half of the yield coming from cultivated oyster farms. Virginia is the leading state in this industry. Salmon are largely caught in the Pacific, and cod, haddock, hake, halibut, mackerel, herring, shad, clam, and lobsters in the Atlantic. The whale fishery of the U.S.A., formerly carried on to a large extent in the N. Pacific and the Arctic Oceans, has very much diminished of late years.

Canada.—The Canadian F. are very extensive, though still exceeded by those of the U.S.A., and they are continuing to increase under careful gov. supervision and assistance. The fish caught are, in order of value, salmon, cod, lobsters, herring, and mackerel. The canning of salmon (from the Pacific coast) and lobsters is an important industry, and the finished product is largely exported. The provs. engaged in the fishing industry are, in order of the value of their produce, Brit. Columbia, Nova Scotia, New Brunswick, Ontario, Quebec, and Prince Edward Is. There is also a large seal fishery in the Behring Sea (see CANADA).

The S. F., mainly for cod, herring, and salmon, on the Newfoundland Banks form the prin. occupation of the people of Newfoundland. The cod F. are the most important, and are carried on on the Banks and off the shores of Newfoundland and Labrador, and the catch also includes seal, herring, lobster, salmon, trout, smelt, and grand turbot. The inshore cod F. is the branch in which the great majority of the fishery pop. is engaged. In 1937-38 between 16,000 and 19,000 men were engaged in the inshore cod fishery, and the total catch was 515,000 quintals in 1938. The Bank cod fishery employed in that year 2200 men, and the catch was 233,000 quintals; and the Labrador cod fishery 2400 men had a catch of 400,000 quintals. Altogether in the cod fishery there were some 10,000 small sailing vessels, motor boats, etc. Lobster-canning for export is an important industry. Cod is largely dried, and exported to Brazil, Spain, Portugal, the U.S.A., and the W. Indies (see NEWFOUNDLAND).

European Fisheries.—**Belgium.**—The Belgian North Sea fishery is carried on from Ostend, Blankenbergh, Heyst, La Panne, and Nieuwpoort. Ostend in 1938 had 360 vessels employing 1500 men. The total quantity of fish landed at Belgian ports in 1944 was 50,000 metric tons. The total fleet tonnage was then under 2000.

Denmark.—There are important Dan. F. in the Baltic, for plaice, flounders, eels, herrings, cod, and garfish; in the North Sea for plaice, haddock, lobsters, and cod; off Iceland and the Faroes for cod and herring, and off Greenland for seals,

whales, salmon, trout, halibut, and cod. In 1938 Denmark had 8000 fishing vessels of all sizes, and 20,000 men were employed in fishing. In 1943-44 the total value of fish caught was 150,000,000 kroner (about 28,000,000 sterling), and in 1946 about 170,000,000 kroner.

France.—The Fr. fishing industry is very important, and before the Second World War received much gov. aid. The great fishery for cod is carried on off Newfoundland, off Iceland, and in the North Sea. The Fr. fishing fleet consisted (1938) of upwards of 18,000 boats and vessels, and gave employment to 70,600 men. The statistics for 1939 show that the Fr. fishing fleet then numbered over 10,000 sailing-boats, over 300 steamers, and 11,250 motor boats; that the industry employed over 130,000 persons, and the value of fish caught was about 1½ billion francs.

Germany.—The Ger. fishing industry, particularly in the North Sea, developed to a considerable extent in the inter-war years. Steam trawling took place from Gessemünde, Bremen, and Bremerhaven, and a deep-sea herring fishery, on the Dutch model, was estab. at Emden. In 1948 the number of vessels of the Ger. fishing fleet was fixed at 287. In 1930 175,000 men and 14,000 boats were employed in F., landing 6,320,000 cwt. of fish valued at 44,274,000. In 1937 the yield of the North Sea fleet was 620,000,000 kilos of fish, valued at 90,000,000 Rm., and of the Baltic F., 51,750,000 kilos, valued at 12,500,000 Rm.

Greece.—Sardines, anchovies, tunny fish, mullet, eels, and mackerel, are caught, but the chief fishery is for sponges.

Holland.—The Dutch fishery products include herring (mainly off the E. coast of England), cod, ling, anchovies, smelts, eels, flounders, shrimps, and oysters. There are exports of fresh and salted fish. In 1938 some 3300 vessels of all kinds were employed in the Dutch F. The produce of the herring fishery in the North Sea was valued at 8,000,000 guilders, and 96,600 tons of herrings were caught.

Iceland.—About 1500 boats and vessels are employed in the F. of Iceland, which gives occupation to 3900 men.

Italy.—Tunny fish is the chief product of It. F., but sardines, anchovies, hake, swordfish, lobsters, cuttlefish, oysters, sea urchins, turtles, and sharks are also caught, and there are valuable F. for sponges and coral. (Trade statistics have been suppressed since 1939.)

Norway.—The chief Norwegian F. in 1930 employed 102,600 men, and yielded produce of the value of 44,720,000. In 1943 38,850 persons were employed in cod F., and 15,600 in winter herring F.; while the total number of persons employed in the F. was 114,000 (of whom nearly 40,000 had a second chief occupation). The output of the sea F. in tons totalled in 1943 642,700, of which herring yielded 306,000 tons and cod 111,500 tons. Herring, cod, and mackerel are the chief fish caught; other kinds are salmon, sea-trout, lobsters, ling, coalfish, torsk, and oysters.

Poland.—The Polish F. were chiefly those taken over in consequence of the political changes following the First World War; these were small and gave employment to about 1280 men. No current statistics are available.

Portugal.—The F. of Portugal employ about 42,000 men, with 15,600 boats. The most profitable part of the industry is sardine fishing, which accounts for nearly half the employment. In 1944 the sardine catch was 128,200 metric tons, valued at 259½ million escudos. Tunny fish are also caught, and whales off the Azores.

Russia.—Fishing in Russia is almost entirely carried on inland; the S. F. of the Baltic, White and Black Seas, the Bothnian Gulf, etc., only providing a small percentage of the total amount. These produce cod, herring, and whales. Cod and herring are imported. Owing to political events statistics are few and unreliable.

People, 1945; and J. W. Kempster, Our Rivers, 1948.

Fisher Marten, see PEKAN.

Fisher's Hill, precipitous bluff in the Shenandoah valley, Frederick co., Virginia, U.S.A., 30 m. S.W. of Winchester. It is noted for a battle fought there in 1864, when the Federal troops under Sheridan gained a victory over the Confederates under Gen. Early. The former lost about 1300 men, while the latter lost 530.

Fisher's Island, is. in Long Is. Sound, New York, U.S.A. It belongs to Suffolk co., and is 8 m. long, with an average of 1 m. in width, and an area of 4000 ac. It is separated from Connecticut by F. I. Sound, a narrow channel. The surface is hilly. Pop. 300.

Fishery Board for Scotland was instituted in 1882 to take the place of the Board of Brit. White Herrings, which was simultaneously dissolved. Investigations had been made and plans had been



FISHGUARD HARBOUR

British Industries

Spain.—The most important products of the Sp. F. are sardines, tunny fish, and cod. Eels, lampreys, hake, bream, and salmon are also caught. The preservation of sardines and tunnies forms an important industry, employing thousands of workers in great numbers of trades in the tinning of sardines. The value of the fishing industry in 1943 was 1,055,000,000 pesetas, representing some 445,000 tons of fish. There are large imports of dried cod, etc.

Sweden.—Swedish F., for long regarded as unimportant, show signs of improvement. In 1937 over 20,000 men were employed. Deep-sea line-fishing is carried on at the Kattegat and in the North Sea. Much of the fish is salted. The total value of the Göteborg and Bohus fishing industry in 1943 was estimated at 61,282,000 kronor.

See W. Brabazon, *Deep Sea and Coast Fishing of Ireland*, 1848; J. B. Karr, *La Pêche*, 1878; N. Wood, *North Sea Fishers*, 1911; P. F. Anson, *Fishing Boats and Fisher Folk of the East Coast of Scotland*, 1930, and *Mariners of Brittany*, 1931; G. L. Alward, *Sea Fisheries of Great Britain*, 1932; A. Stanford, *North Atlantic Fishermen*, 1939; F. Fraser Darling, *The Seasons and the Fisherman*, 1941; A. Hamilton Jenkin, *Cornwall and its*

brought forward to prevent the destruction of the spawn of sea fish, and the F. B. for S. was entrusted with the task of improvement. Experiments were made, and with the assistance of a gov. grant of £3000 a steam yacht was purchased, the fifth of Firth closed, and a laboratory and sea-fish hatchery estab. A comprehensive programme of investigations has since been carried on successfully with international co-operation. The important regulations of the Salmon and Fresh Waters Fisheries Act of 1923 do not apply to Scotland.

Fishguard, or Aberavon, seaport tn. of Pembroke, Wales, situated at the mouth of the Gwaen in F. Bay, 25 m. N. of Pembroke, and 258 m. from London. It is one of the seven Pembroke bors., and is divided into two parts; the upper portion stands high up on the cliffs, overlooking the harbour, and contains the par. church, market-place, etc., while the lower tn., joining the quay, is occupied by the fishermen. The bay affords good shelter and anchorage. The depth of its fine natural harbour at the entrance is 14 ft. at high water and 8 ft. at quayside. F. is a port of call for Cunard liners from New York and Booth liners from S. America, and there is a service of passenger and freight steamers to Rosslare, Waterford, and

Cork, the first of which is the shortest sea passage from England to Ireland. Pop. with Goodwick 5100.

Fish-hawk, see OSPREY.

Fish-hooks. These were, in very early times, made of stone, bronze, copper, and sometimes shell, as relics belonging to a prehistoric era have been discovered. In spite of their antiquity, however, some of them resemble very closely those of modern times, though some seem to have been quite original in idea, as those made of the spine of a cactus and used by Indians. The place in England where F. are principally made to-day is Redditch. They are usually composed of soft steel wire, afterwards hardened and polished, and may be manufactured either by hand or machinery. Their shapes differ, and the number of designs which are executed is considerable. The one most generally in use has the point parallel to the shaft, although some anglers prefer it bent in another direction. The ends also may be ringed, flattened, or simply plain.

Fishing-eagle, see OSPREY.

Fish-lice, name generally applied to any of the copepod crustaceans which are parasitic on fishes; there are many genera and species, which are ectoparasitic, as *Caligus* or epizootic. See EPIZOOTIC.

Fish-oils are esters of glycerol, with highly unsaturated fatty acids containing twenty or more carbon atoms. Many of them, e.g. cod-liver oil, sardine oil, seal oil, and whale oil are of medicinal, nutritional, or industrial importance; thus whale oil is used in the manuf. of margarine and soap.

Fish River, see GREAT FISH RIVER.

Fish River Caves, see BLUE MOUNTAINS and JENOLAN CAVES.

Fiske, John (1842-1901), Amer. writer and philosopher. In 1869 he was appointed lecturer on philosophy at Harvard, and in 1881 at St. Louis Univ. His first philosophical work in literature was *Outlines of Cosmic Philosophy* (1874). Other works include *The Unseen World* (1876); *The Origin of Evil* (1899); and historical works such as *The Discovery of America* (1892); *Old Virginia and her Neighbours* (1897); and *New France and New England* (1902).

Fission, in atomic science, the splitting of the nucleus of an atom. Thus the nuclei of plutonium, uranium, and other elements undergo F. with the release of vast quantities of energy. The nuclei of heavy elements are more susceptible to F. than those of light elements. The products of F. are usually radioactive.

Fistularia (Lat. *fistula*, a pipe), generic name of a fish belonging to the family of Aulostomatidae, or flute-mouths. It is characterised by a long tubular muzzle, terminating in a small mouth, and by the pelvic fins consisting of six soft rays. The body is naked and the forked caudal fin has one or two of its middle rays produced into a long whip-like filament. This genus inhabits the tropical Atlantic and Indian Oceans, and the family is closely allied to that of the sticklebacks (q.v.).

Fistulina, genus of hymenomycetous fungi, of which one species, *F. hepatica*, is common to Britain. It grows prin-

cipally on old oak-trees, and is liver-like in appearance. It is used in some countries for edible purposes, and when cooked is said to resemble grilled meat.

Fitch, Ralph (fl. 1583-1608), traveller, and is remembered as the pioneer among Englishmen who took the overland route to India. He set out in 1583 and returned in 1591. The account of this journey was pub. by Hakluyt in 1599. See J. H. Itley, *Ralph Fitch, England's Pioneer to India and Burma*, 1899.

Fitch, William Clyde (1865-1909), Amer. playwright, b. and educated in New York, where his first play was produced in 1890. He wrote a large number of dramas, among them being *Beau Brummel* (1890); *The Moth and the Flame* and *Nathan Hale* (1899); *The Cowboy and the Lady* and *Barbara Frietchie* (1900); *The Climbers* (1901); *The Girl with the Green Eyes* (1902); and *The Truth* (1906), with which he gained an international reputation.

Fitchburg, city of Massachusetts, U.S.A. in Worcester co. It is situated 50 m. N.W. of Boston on a branch of the Nashua R. The prin. manufs. are pulp, cotton, and woollen goods. There are granite quarries. Pop. about 41,800.

Fitoles, or **Fare**, see VETCH.

Fittig, Rudolf (1835-1910), Ger. chemist; b. at Hamburg. Studied chem. at Göttingen. He assisted Wöhler, the organic chemist, in 1858, and taught in Göttingen, 1860-70. Prof. of chem. at Tübingen, 1870-76; thenceforward prof. at Strassburg. He discovered the lactones, or anhydrides of oxyacids, and synthesised sev. hydrocarbons. He was the discoverer of phenanthrene. F. re-ed. Wöhler's works, and wrote *Über Aceton* (1858); *Das Wesen und die Ziele der chemischen Forschung und des chemischen Studiums* (1870); and *Grundriss der unorganischen Chemie* (1872). Received the Davy medal of the Royal Society, 1906.

Fittou, Mary (fl. 1600), daughter of Sir Edward F., a native of the co. of Cheshire, England. She was a maid of honour at the court of Queen Elizabeth, and was one of the performers in the masque at the wedding of Lord Herbert in 1600, shortly afterwards becoming his mistress. Some people have identified her with the 'dark lady' of Shakespeare's sonnets.

Fitz, from the Norman-Fr. word *fitz* (Lat. *filius*), meaning son. It was and is used as a prefix to a surname to show descent—as the Scottish prefix *Mac* and the Irish *O'*—appearing in such words as Fitzwilliam and Fitzhamilton. It was also used as the surname of illegitimate children of kings or princes, as in Fitzjames and Fitzclarence.

Fitzalan of Derwent, Sir Edmund Bernard Fitz-Alan Howard, first Viscount (1855-1947), Eng. viceroy and politician, third son of Henry Granville, earl of Arundel, and later duke of Norfolk. Commissioned in the 11th Hussars, 1875. Saw service in the S. African war, being promoted lieutenant-colonel, 1900. Conservative member for Chichester, 1894-1921. Junior lord of the Treasury, 1905. Unionist chief whip 1913, and joint pers. secretary to the Treasury, 1916. Privy

Councillor, 1918. G.C.V.O., 1919. Succeeded Lord French as the first viceroy of Ireland under the Act of 1920, being raised to the peerage in the next year, and made lord lieutenant. K.G., 1925. President of the Catholic Union of Great Britain. He will be remembered as a man of wide social and political influence, and as a man whose advice on questions of procedure was highly valued by the authorities of the Rom. Catholic Church.

Fitzalan, Edmund Henry, and Richard (2), see ARUNDEL, EARLS OF.

Fitzgerald, Lord Edward (1763-98), son of the first duke of Leinster; served in the Brit. Army until 1792, when he was cashiered for being present at a revolutionary meeting at Paris. He was described by Cobbett, who served under him in the 54th Regiment, as the only really honest officer he had ever known. He now threw in his lot with the United Irishmen, and began to prepare schemes for a rising in that country. It was impossible for the gov. to ignore his action, and after he had been given an opportunity to escape to France he was taken prisoner. A wound that he had received in the struggle mortified, and he d. in Newgate on June 4. There is a biography by Thomas Moore.

Fitzgerald, Edward (1809-83), poet, went to Trinity College, Cambridge, in 1826, and there made lifelong friendships with the Tennysons, Thackeray, Spedding, Donne, W. H. Thompson, and the rest of the coterie. When he came down from the univ. he settled at Woodbridge. He found pleasure in letter-writing and in boating, but his prin. interest was in books. In 1851 he pub. anonymously *Euphranor, a Dialogue on Youth*, and in the following year *Polonius, a Collection of Wise Sayings and Modern Instances*. He issued in 1853 a free trans. of *Six Dramas of Calderon*, and six years later gave to the world his rendering of the *Rubáiyát* of Omar Khayyám, which has made him famous in all the Eng.-speaking countries and has passed through innumerable eds. But Quaritch, who first pub. the poem (he pub. 250 copies in 1859), met no success with it, and it was only after Rossetti found a copy in the 'fourpenny box' outside Quaritch's shop that the work began its road to fame. Other and more faithful trans. have been produced, but none approaching that of F. for glow and atmosphere. His complete works and correspondence were ed. in 1902 by Aldis Wright, and there are biographies by Groome (1895), Thomas Wright (1904), A. C. Benson (1905), and A. M. Terhune (1947). See also essay by L. Housman and biography by G. F. Maine in Collins's ed. of *The Rubáiyát*, 1947.

Fitzgerald, Francis Scott Key (1896-1940), Amer. novelist, b. at St. Paul, Minneapolis, U.S.A. Educated at Princeton Univ. (1913-17). Wrote *This Side of Paradise* (1920); *The Beautiful and Damned* (1921); *The Great Gatsby* (1925); and *Taps at Reville* (1935).

Fitzgerald, small tn. of Georgia, U.S.A., situated in Irwin co., 25 m. N.E. of Tifton. Pop. 7300.

Fitzgibbon, John, see CLARE, EARL OF. Fitzherbert, Maria Anne (née Smythe) (1756-1837), was a Rom. Catholic and the wife of George IV., though not openly acknowledged as such. She had been twice married before meeting George—then Prince of Wales—to whom she was married in 1785—the marriage not being valid, as it had taken place without the king's consent. On marrying Princess Caroline he, for a time, broke off his consortium with Mrs. F., but it was not finally ended until 1803. See S. Leslie, *Mrs. Fitzherbert*, 1939.

FitzJames, see BERWICK, JAMES FITZJAMES, DUKE OF.

Fitzmaurice, Edmond George Fitzmaurice, Baron (1846-1935), son of the fourth marquess of Lansdowne, was educated at Eton and Cambridge. In 1869 he became an M.P., representing Calne until 1885, and the Cricklade div. of Wiltshire (1898-1905). Raised to peerage Jan. 1906. Held minor ministerial posts in the Foreign Office, but is remembered more for his biographies, particularly his lives of Granville and Shelburne. Among his literary works are *The Life of William, Earl of Shelburne* (1875-77); *Sir William Petty, the Political Economist* (1895); *Lettres de l'abbé Morellet* (1898); *Charles William Ferdinand, Duke of Brunswick* (1901); and *The Life of George Leveson-Gower, second Earl Granville* (1905).

Fitzmaurice, Sir Maurice (1861-1924), chief engineer of London Co. Council (1901-1912), graduated as M.A. and M.E. from Trinity College, Dublin. Among his engineering works are the Rotherhithe tunnel, the subway for electric trams below Kingsway; and the electric tramways, and the duplication of the main drainage system of London.

Fitzmaurice-Kelly, James (1858-1923), was in 1900 examiner in Sp. at the univ. of Oxford, and Taylorian lecturer at the same univ. in 1902. His literary work, which is chiefly on the literature of Spain, includes *The Life of Miguel de Cervantes Saavedra* (1892); *Un Hispandito inglés del Siglo XVII.* (1899); *History of Spanish Literature* (1898); *Lope de Vega and the Spanish Drama* (1902); *Chapters on Spanish Literature* (1908); *Miguel de Cervantes: a Memoir* (1913); *Cervantes and Shakespeare* (1916); and ed. Cervantes's complete works, 1901, etc.

Fitzroy, Augustus Henry, see GRAFTON, DUKE OF.

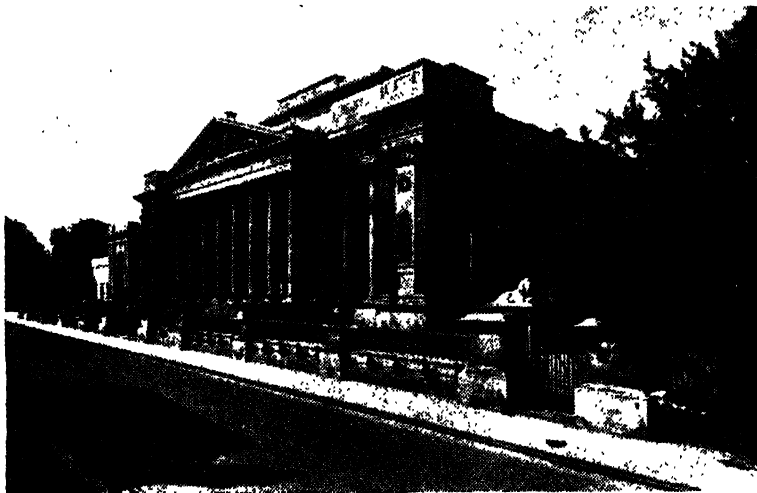
Fitzroy, Robert (1805-65), Eng. admiral, hydrographer, and meteorologist. From 1828 to 1830 he captained the *Beagle*, then employed in a survey of the coast of Patagonia, Tierra del Fuego, Chile, and Peru. It was during this voyage that he discovered the inland sea called Otway Water, and its connection with the salt Skyring Water by means of what came to be known as Fitzroy Channel. During a circumnavigating voyage in the *Beagle* in 1831-36, when Charles Darwin accompanied him, F. not only ran a chronometric line round the world, but recorded a number of invaluable meteorological observations, the most famous of which are his storm warnings. These were all

gathered together in his *Weather Book* of 1863.

Fitzroy: 1. City of Victoria, Australia, in Bourke co. It is 2 m. N.E. of Melbourne, and it forms a suburb of that place. Pop. 35,000. 2. Riv. of Queensland, formed by the junction of the Dawson and Mackenzie Rs. It flows eastward into the Pacific, near the tropic of Capricorn, at Keppel Bay, and is navigable from its mouth for 35 m. to Rockhampton. 3. Largest riv. of W. Australia, whose source is in King Leopold Mts. It has a westerly course, flowing through beautiful well-watered plains.

of London. F. was a devoted adherent of Becket, dining at his board and serving as remembrancer in his chancery and sub-deacon in his chapel, and was, moreover, one of the few who loyally stood by his master at his death.

Fitzurse, Reginald (fl. 1170), enjoys an evil notoriety as one of Becket's murderers. With his three confederates he determined to fulfil the prayer uttered by the king in a momentary passion, and after the deed was done suffered excommunication, and with his fellow knights was exiled, it is said, to Palestine, where he *d.* within three years of his crime.



Reproduced by courtesy of the Director

FITZWILLIAM MUSEUM

and finally enters King Sound. Steamers navigate the riv., 100 m. from its estuary. The source of the F. was discovered in 1842 by Stokes, although the riv. itself was not explored until 1897.

Fitzsimmons, Robert (1862-1917), Eng. prizefighter, *b.* at Helston, Cornwall; taken to New Zealand, 1871; became amateur boxing champion there. In 1890 he went to the U.S.A.; won middleweight championship in New Orleans, 1891; won heavyweight world championship from Corbett (*q.v.*) at Carson City, 1897. Beaten in Coney Is., 1899 by Jeffries. Beaten by Jack Johnson in 1907.

Fitzstephen, William (*d. c.* 1191), biographer of Thomas à Becket, wrote in 1174 his valuable if biased *Life and Passion of Archbishop Becket*, which he pub. together with his *Description of the City of London*. A trans. of the latter, which, except for the Domesday Book, gives the earliest topography of the metropolis, is appended to Stow's *Survey*

Fitzwilliam, William Wentworth, second Earl Fitzwilliam in the peerage of the United Kingdom (1748-1833), succeeded in 1782 to the estates of his uncle, Lord Rockingham, and was thenceforth one of the richest peers of his day. An enthusiastic Whig, he was one of the duke of Portland's party who coalesced with Pitt in 1794, and was later in the year appointed lord lieutenant of Ireland. He held this office only for a few months, being recalled for supporting the Rom. Catholics' claims in defiance of his instructions. He was president of the Council in 1806 under Grenville, but after this did not again take office.

Fitzwilliam Museum, which is at Cambridge, possesses an excellent collection of engravings, MSS., and books left by its founder, Richard, Viscount Fitzwilliam of Merpton, to the univ. on his death in 1816. The building itself is a beautiful example of Gk. architecture, standing not far from Peterhouse College. The Marlay

galleries were added in 1924, and the Courtauld galleries in 1931. The Marlay court includes coins, pottery, porcelain, and majolica, and these galleries rank with the finest in the world. In the founder's collection are a splendid Rembrandt, paintings by Veronese, Titian and Palma Vecchio; 130 medieval MSS., unique prints, and early Eng. music. In 1893 a series of It. primitives was added. The lighting of the galleries has served as a standard for later building of this description, and the unpolished wood background for the pictures is accepted as a model. Sir Sydney Cockerell, director 1908-37, was succeeded by Mr. L. C. G. Clark (during the Second World War), and Mr. Carl Winter. The Fitzwilliam is vastly indebted to private benefactions. In 1948 Lord Fairhaven gave the museum £30,000 to purchase Brit. drawings and paintings.

Fiume, or Rijeka, seaport of Croatia, Yugoslavia, 70 m. S.E. of Trieste; situated at the mouth of the Fiumara, and at the head of the gulf of Quarnero, in the Adriatic. It is divided into two portions: the anct. tn. is built on the hill slope or Karst ridge, and contains a triumphal arch, supposed to have been erected in honour of Claudius II. The newer parts are crowded into the amphitheatre between the Karst and the shore. Among its historic churches are those of the Ascension, with a front in the Rom. Pantheon style, and St. Velt, an imitation of Sta. Maria della Salute in Venice. It has two harbours, the main harbour being formed within a long breakwater and having a deep entrance, with 30 ft. of water at the quays. The other harbour is Porto Baros. Coastwise vessels use Porto Canale. There are petroleum refineries, distilleries, and tobacco factories, chemical works, and a torpedo factory. Wood, sugar, rice, and petroleum are exported. Connected by rail with Trieste, Ljubljana, and Zagreb. Few places have been more often contested throughout their hist. It is first mentioned in the thirteenth century, since when it has successively been the property of Austria, Croatia, France, Austria, Hungary, Croatia again, and Italy. The pop. of Fiume is distributed somewhat as follows: Its., 30,000; Magyars, 7000; Croats, 17,000. The preponderance of Its. was a vital factor in settling the question of its disposal after the First World War. It owes its importance to being the terminus of a railway from Budapest and to the fact that it is one of the very few ports on the E. Adriatic. For about fifty years before the First World War the Its. and Magyars united in opposing any scheme to extend the political and municipal franchise to the suburb of Sušak, which was mainly Slav. F. (without Sušak) gradually became an It.-Magyar city in appearance, while Austria spent much money on the shipping which was owned by Croats.

By the secret treaty of London (1915), under which Italy entered the First World War, F. was given to the Croats, but after the war It. political writers claimed it for

Italy on the ground that their nationals were predominant. To put matters beyond doubt Gabriele D'Annunzio (q.v.), the poet and novelist, took matters into his own hands by collecting a small force, with which he raided and occupied the place in Sept. 1919. Although this venture was not officially noticed to any serious extent, it was approved by many influential Its., and it undoubtedly influenced Mussolini (q.v.) and Farinacci (q.v.) in the 'march' on Rome. Various attempts were made to eject him which, however, did not at first succeed. Eventually F. was ceded to Italy in 1924 in spite of the protests of other nations concerned, especially Yugoslavia. Under the treaty, signed in Rome, Jan. 27, 1924, the free state of F. came to an end. Yugoslavia's sovereignty over Port Baros and the delta was estab., while Italy acquired the tn. and harbour works of F., together with a narrow strip of hinterland. After the Second World War Yugoslavia's peace treaty with Italy (Feb. 10, 1947) gave F. to the former, together with the greater part of the prov. of Venezia Giulia. See S. Gigante, *Storia del comune di Fiume*, 1929.

Five Members, The, of Parliament, were John Pym, Denzil Holles, Sir Arthur Haselrig, Wm. Strode, and John Hampden. In violation of all constitutional liberties, Charles I. tried to arrest them on Jan. 4, 1642, so as to prevent Henrietta Maria's impeachment. This foolish endeavour undoubtedly hastened the Civil war.

Five Mile Act, The, passed in the reign of Elizabeth, penalised Rom. Catholics, who had been convicted of non-attendance at the Protestant church, for going a greater distance than five miles from their homes. A more famous and less stringent Act of the same name was passed in 1665, whereby no nonconformist preacher or teacher could come within 5 m. of any tn. or bor. corporate or any place whatever where he had preached or taught since the Act of Oblivion (1660) unless he first took the oath of non-resistance and pledged himself not to interfere either with the Church or State. This law remained in force till 1689.

Fives, game of handball, played by two or four players in a court enclosed on three or four sides. It is at least as old as the fourteenth century, and is almost certainly derived, like racquets, from the Fr. *Jeu de paume*, which became known in England as hand-tennis. Various explanations of the name have been offered, the most common being that it refers to the five fingers, but the origin is obscure. To-day it is not played much outside schools and colleges, but it retains a deserved popularity with schoolboys, the Etonians especially being fond of the game. In America it is called handball, and the courts are sometimes 60 ft. long compared with 34 ft., which is the normal length in this country. F. is a very healthy form of sport, as it is played in the open air and exercises every limb of the body. In winter, indeed, it is one of the pleasantest means of promoting a good circulation in

a small space of time. There are many varieties of courts, and the codes of rules will be found to differ fairly extensively in different public schools, but a brief description of Rugby F. and of the points in which Eton F. is at variance will give the reader some notion of the nature and objects of the sport.

To begin with, no apparatus is necessary except the ball, which is commonly made of white leather, stretched over a firm cork foundation, and, if the player chooses, a pair of padded gloves. The court consists of a front and two side walls, these latter usually sloping towards the back, often from 12 to 20 ft. It may be roofed or otherwise, and sometimes has at the back a dwarf wall or projection. It is invariably divided into a fore and back court, technically known as on and off wall, and in a double, when there are two partners a side, these stand diagonally to one another. Thus the server or hand-in stands in the fore court nearer the left wall, one of his opponents standing opposite to him in the same court. The other two players guard the off wall. Hand-in serves, and must hit the ball with his hand against the front wall above a line, marked with a board or other device at least 3 ft. above the ground level, in such a way as to cause it to rebound from the right-hand side wall on to the ground on the off wall. Hand-out, that is his opponent in the fore court, may refuse the serve if he likes, but the game cannot proceed till he has returned one of the server's strokes. After his first-cut, or return, the ball is kept flying by either side alternately, there being no restriction as to which of the two partners hits the ball at any time. The winning side is that which first scores fifteen points; the server only can score, and wins a point when the opposing side misses a point, that is, fails to keep the ball going. If he loses a stroke, his partner becomes hand-in until he too fails; when the other side has its innings. In any return the ball may be volleyed and may be made to touch one or both of the side walls beside the front, which all the players face, and which must invariably be hit above the horizontal line or plank already referred to. At Eton the game was first played against the chapel walls, buttresses serving as side walls and the steps projecting from the side. The steps in the proper F. courts became the famous pepper-box, which juts out from the left side wall, making the game considerably more intricate, whilst the platform or dais leading to the flight of chapel steps gave rise to the hole, that is, the space between the pepper-box and the step which was introduced to break the level of the F. court floor. F. is also played at Winchester and Rugby. See books by J. Marshall and others, 1890, and J. A. Tait, 1890.

Five Towns. The name applied erroneously (for there are six) to the Eng. and N. Staffordshire pottery tns. of Tunstall, Burslem, Hanley, Stoke, Fenton, and Longton. See A. Bennett, *The Grim Smile of the Five Towns*, 1907.

Five Year Plan, name given to the plan

of the Soviet Gov. so to increase their industrial and agric. output during the period 1928-33, as to overtake all other nations. To effect this ambitious object the country was supplied with factories, railways, motor vehicles and tractors, and other equipment; while houses were to be built and land cultivated and amenities given to the whole people. The political aim of the plan was to enhance the power of the Soviet in every direction—economical, political, and industrial—but in fact the people were sacrificed to the plan, for the food raised was exported in exchange for secondary imports required for industrial development. The chief industries developed under this plan were manganese production at Chisturi, asbestos at Asbest, steel at Magnitogorsk, wheat at Gigant and Verblud, petroleum and crude oil at Baku, tractors at Cheliabinsk, Kharkov, and Stalingrad, and tea at Chakwa. Electrical energy is provided by installations at Dnieprostroy erected under the supervision of Amer. engineers. The plan was certainly ahead of the scheduled time in its political development, and by 1931 such good progress had been made that the State Planning Commission stated that the gov. had decided to begin work on a new F. Y. P. for 1933-38. By 1937 this plan had been completed and a new period embarked on. The Second World War interrupted the progress of this third plan, but a fourth, announced for 1946-50, was devoted to the building up again of heavy industry. See further under RUSSIA.

Godless Five Year Plan.—The name given to a plan embodied in a decree issued by the Council of People's Commissaries in Oct. 1932 with the object 'not to leave a single house of prayer on the territory of the Union of Soviet Socialist Republics, and to extinguish in the minds of the people the very notion of God.' See B. Brutzkus, *Economic Planning in Soviet Russia*, 1935.

Fixed Stars, see STARS.

Fixed Trusts, or Fixed Unit Investment Trusts, are investment companies, which purport to open up to the investor of small means a wider field, so as to enable him to spread his risks, with relative safety. Some of these trusts are general, their investments being made over a variety of industries; others are specialised, i.e. they restrict their operations to one industry or field; and yet others are cumulative as opposed to those which distribute in cash any capital bonuses received, as well as dividends. The life of a trust is fixed by deed, with, in some cases, the option of conversion to a trust company at the end of the period. The first Brit. Unit Investment Trust was formed in 1931, immediately before the Brit. Gov. went off the gold standard, and the movement was much favoured by the ensuing steep rise in ordinary share values which followed the boom in gold shares in 1932-1933 and thereafter. The bulk of the holdings of the F. T. are in the ordinary shares of well-established companies, and, by the end of 1938, the movement in Great

Britain had taken such a hold that there were over eighty trusts in the country. Most of them were affiliated to the Unit Trusts Association. Promotion and management rest with a number of distinct groups, operating through private companies. In the U.S.A., during the period of the rise and development of F. T. in Britain, there was a corresponding collapse of F. T. following on the crash in Wall Street in 1929. The majority of trusts formed in the first four or five years of the movement were operated on a fixed small panel of no more than a score or so of selected securities or equities; but later trusts acquired powers to operate from considerably larger fields of securities, including also trustee securities, thereby tending to wide flexibility and partial reversion to the old managed type of investment company. These latter are known as flexible unit investment trusts, in contradistinction to F. T. In consequence of the growth of the F. T. movement in Britain a gov. bill for the prevention of share-pushing—the Prevention of Fraud (Investments) Bill—was introduced in 1938, and passed its third reading in the following year.

Fixtures. Generally speaking, the term F. denotes anything in the nature of personal property (chattel) has become annexed to the freehold so as to become part and parcel of it. More popularly F. may be defined as things of an accessory nature annexed to houses or lands. The justification for the old common law doctrine of the irremovability of F. was that if any limited owner, e.g., a tenant for life or for years, removed the F., he necessarily committed waste, i.e. an act of destruction which injures or diminishes the value of the inheritance; and, further, that the mere fact of annexation indicated an intention to abandon his ownership in the F. From early times the common law rule was relaxed in favour of the principle that the circumstances of the annexation might show an intention in the parties to the contrary of the common law presumption. The degree and object of the annexation became all-important, and the rule became estab. that whatever chattel was annexed, merely for its more complete enjoyment and use as such, could be removed, but that where the purpose of the annexation was the improvement of the freehold, the chattel was irremovable. This obviously did not go far enough. However much a tenant for life under a marriage settlement may desire to improve the freehold, no thought could be further from the mind of a trade tenant, or, indeed, any tenant having no sort of relation other than contractual with the freeholder. Consequently the law in its relaxation of the old doctrine, on grounds of public policy, in favour of ornamental F., F. for convenience, trade F., and F. for business purposes, proceeded rather on the principle that what could be removed without material injury to the freehold was removable by the lessee or tenant in the absence of special stipulation to the contrary. Much greater indulgence, however, is and has always

been extended to the case of trade than to merely ornamental F., and that greater indulgence is expressed in the orthodox rule that to take away the right to remove, the probable damage to the freehold must be so great as practically to destroy it. In the case of ornamental and domestic F., the rule appears to be that removal will only be allowed if little or no damage be thereby caused to the freehold or to the fixture itself. The common law doctrine has also been relaxed by a number of statutes in the case of agric. F., but this was a much more belated concession to the claims of natural justice. In connection with these relaxations, it is to be noted that the above exceptions are construed more or less strictly according as the dispute is between (a) heirs and executors of the same owner; (b) executors of the tenant for life or tenant in tail (see *ENTAIL*), and the remainder man or reversioner; and (c) between landlord and tenant. The law is strictly construed in favour of the inheritance in class (a), but it is relaxed in class (b) in favour of the limited owners, while in (c) the greatest indulgence is extended to tenants.

A more detailed reference may now be made to the law of F. as between landlord and tenant. A tenant may only remove his F. during the subsistence of his term unless expressly allowed to do so subsequently. Landlords' F. include those put up, not only by the landlord himself, but by any person other than the tenant, and such as have been put up but may not be removed by the tenant. It is usual, however, in leases to specify in a schedule not only the F. already on the premises or land, but such additions by the tenant as he may not remove even if he does hereafter make them. There is not a little confusion in the law as to landlords' and tenants' F. It is by no means clear what, in the absence of express stipulation, is the test of removability. As stated in the accepted text-books, the rule is that, however large the structure or thing may be, however solid or substantial it is removable if it is so constructed as not in fact to be fastened to or let into the freehold. From one point of view this principle of the degree of physical annexation may be looked upon as no more than a test of the probable damage resulting from the removal. This reversion to the root principle of the law of F. involves, in effect, the abandonment of all the concessions so painfully won at the expense of the freeholder. This conflict of principle, however, works less confusion than may be imagined, and for two reasons: (1) Contracts are generally so drawn as to provide for all eventualities; and (2) a great number of empirical exceptions to the ant. doctrine enable one in a moment to refer to one or other of them the great majority of chattels annexed to land or buildings; e.g. barns, mills, sheds, etc. Erections on blocks, rollers, patterns or plates, the whole resting upon brickwork, but not united to the land or building by mortar or nails, are removable by the tenant. The decided cases also show that even if the structure

is erected on a brickwork foundation let into the soil with uprights rising out of the brickwork, it is removable provided there be no actual fastening. Consistently with these decisions, stills set in brickwork have been held irremovable, but not vats merely supported by and resting on brickwork and timber. *Inter alia*, the following things of ornament or convenience are removable by the tenant: Cornices, beds fastened to the walls or ceilings, furnaces and coppers, cupboards fixed with holdfasts, bookcases screwed to the walls, clock cases, hangings, tapestry, marble chimney-pieces, wash-tubs and fixed water-tubs, grates, stoves and ranges, ovens, pier glasses nailed to the walls, window-blinds, wainscot fixed by screws, and iron backs to chimneys. The following have been held irremovable: Verandas the lower part of which is attached to posts embedded in the soil; conservatories erected on brick foundations affixed to or communicating with rooms in a dwelling-house; and green-houses fixed with mortar or nailed to foundation walls of brickwork. It is to be noted, however, that some of these latter structures would be removable, despite the degree of their physical annexation, if they were erected for trade or business purposes. In regard to a tenant's trade F., the cases show that the following, *inter alia*, may be removed: salt pans, vats, chimneys, machinery, tables, steam and fire-engines. It is clear that the removal of some of these trade F. would result in not a little damage, but the difficulty in point of principle is got rid of by creating the exceptions in spite of it. In a contract between landlord and tenant it is desirable, especially from the tenant's point of view, to insert clauses in his lease expressly limiting the effect of the *pro forma* clause to 'deliver up the premises at the end of the term together with all fixtures.' The effect of a covenant (q.v.) to deliver up premises and all F. belonging thereto, without further explanatory words, has been construed to mean that the tenant's F. are to be delivered to the landlord as well as other F. Consequently, to guard his own interests, the tenant should always put in a proviso expressly excepting his own F. The right of a tenant to remove F. does not extend beyond the subsistence of his term, unless power be expressly given him to enter and remove them after the expiration of the lease.

Agric. tenants were not allowed to remove their F. until 1851, when such F. as were erected with the landlord's written consent were allowed to be removed, provided no injury were done to the freehold, and a month's notice to the landlord of intention to remove were given, and provided also the landlord did not elect to buy the F. The Agricultural Holdings Acts, 1875-83, went further and allowed removal, even though the erection was without the landlord's consent. The right of a tenant to remove agric. F., for which he is not by statute or otherwise entitled to compensation, and which have not been erected in place of some F. belonging

to the landlord or in pursuance of some obligation to the latter, is subject to these conditions: (a) Before removal all arrears of rent must be paid and all other obligations to the landlord fulfilled; (b) no avoidable damage to any other building or part of the agric. holding must be done; (c) such damage as has been unavoidably occasioned must be made good; (d) one month's notice must be given; and (e) any dispute as to the value where the landlord elects to purchase is to be settled by arbitration. Under the Agricultural Holdings Act, 1923, the tenant may, within a reasonable time after the expiration of his term, remove F. which he has erected, unless the landlord chooses to take them over at a valuation. See LANDLORD AND TENANT.

For a full list of chattels held to be removable by a tenant, see Woodfall on *Landlord and Tenant*. See also EXECUTOR; CONTINGENT REMAINDER; REVERSION.

Fjord, see FIORD.

Flabellifera, or Fan-bearer, name given to a certain order of isopods. These particular isopods have tail-fans at their extremities, formed by the end-piece or telson and the last pair of appendages. Within this tribe there are many varieties or families, and one classification is into parasitic and non-parasitic F. In the former div. come *Carolina* and *Conilera*, whilst the gribble or *Limnoria lignorum* is one of the most important in the latter. See also GRIBBLE.

Flabellum, or Fan, used in the W. Church from the fourth to the fourteenth century to keep flies from the sacred vessels. Formed in Rome of peacocks' feathers, and, in other places, of metal. The ministry of the F. was primarily confided to the deacon, though afterwards, in the Lat. Church, it might be exercised by any person who had received the tonsure. The Gks. and the Armenians were, later, the only Christians who made use of the F.

Flaccus, Gaius Valerius (d. A.D. 88), Rom. poet who wrote *Argonautica*, a poem discovered by Poggio Bracciolini in 1416, and first printed in Bologna in 1472. F. lived in the reign of Vespasian, and was known to Martial, who urges him in one epigram to give up poetry for the more lucrative profession of law. The poem has many purple patches, but is disconnected, sometimes obscure, and not infrequently spoilt by the pedantry of the writer. Eight cantos only have come down to us. See trans. by J. H. Mozley, 1934.

Flaccus, Lucius Valerius, Rom. warrior and statesman, was consul in 100 B.C., the remarkable Marius being his colleague. Throughout his career he allied himself with Marius, and consequently assisted in the quelling of Saturninus' revolt. In 86 he was again elected consul, but his own soldiers put him to death before he could proceed against the formidable invader, Mithridates.

Flaccus, Marcus Fulvius (d. 121 B.C.), Rom. democrat, belonged to an illustrious patrician family, but identified himself with the Gracchan or popular party. On

the death of Tiberius Gracchus, he was appointed one of the three commissioners to carry out the agrarian reforms. His proposal during his consulate of 125 that all allies should have the Rom. citizenship led indirectly to the plebeian revolt known as the Social war. The senate, after making two unsuccessful attempts to banish him from Rome, was finally relieved of its hot-headed opponent during the riots which followed its organised opposition to Gracchus in 121. Both F. and his greater leader were slain.

Flaccus, Quintus Horatius, see HORACE.
Flacius (or **Flach**), **Matthias** (1520-75) (whose proper name was Vlacich ('known in Croatian literature as Matija Vlačić Ilir'), and who was surnamed Illyricus), b. at Albona, Istria, a follower of Luther, led so stormy a life that the volume and merit of his literary output are truly remarkable. He studied successively in Venice, Basle, and Tübingen, and in 1541 gained a small livelihood by teaching Gk. and Heb. in Wittenberg. He was the victim of spiritual depression and despair. Luther, however, drove away his melancholy and doubts and converted him into an enthusiastic Protestant reformer. The siege of Wittenberg forced him to leave the city (1547), and on his return he was soon banished once more. This time because of his vehement opposition to Melancthon, who henceforth made Wittenberg a stronghold. His enforced wanderings carried F. in turn to Magdeburg, Jena (1557-61), Regensburg, Antwerp, Strasburg, and Frankfurt, where he d. in extreme poverty. His *Magdeburg Centuries* is the first great hist. of Protestantism, whilst in his *Catalogus Testium Veritatis* (1556); *Clavis Scripturæ Sacre* (1567); and *Glossa Compendiaria in Novum Testamentum* (1570) he proves himself the first exponent of scriptural hermeneutics. See life by W. Preger, 1859-61, and W. Nigg, *Kirchengeschichtsschreibung*, 1934.

Flag, piece of cloth attached to the end of a staff, serving as a national or local emblem, or used for naval and military purposes, or for signalling. It originated from the representations of various animals and other objects that ant. nations were wont to use for similar purposes. Thus the Romans first used the manipulus, a wisp of straw or fern attached to a pole, which served as the rallying-point of the soldiers. This was succeeded by the figure of animals, such as the eagle, wolf, horse, etc., of which the eagle alone survived until the days of the empire. The first Rom. flag was apparently the vexillum, the standard of the cavalry, a square piece of cloth attached to a cross-bar on the end of a gilt staff. The labarum was a Rom. military standard bearing at first the head of the emperor, but from Constantine's time the Gk. letters XP, signifying Christ, when it was made the imperial standard. One of the earliest forms of Fs. was the gonfalon or gonfalon (from Middle High Ger. *gund*, battle; and *fano*, flag), a square or oblong piece of cloth, sometimes with streamers, attached to a cross-bar or fixed in a frame in which it could turn. The

gonfalon of William the Conqueror bore a gold cross on a white ground with a blue bordure.

The pennon (Lat. *penna*, a wing) was the ensign of the medieval knight bachelor and was a tapering F. forked at the fly, exhibiting the arms or badge of its owner. The pennoncel or pencil was a small streamer, triangular in form, wide at the staff, and pointed at the fly, carried by the esquires and bearing the cognisance of their leaders.

The banner was a rectangular F. borne by nobles of the rank of knight banneret and upwards, and displaying the owner's coat of arms. The standard was a large, long F. tapering towards the fly and slit at the end. It varied in size according to the owner's rank and displayed his badge. In addition, the various trades and guilds also had special Fs., which when necessary were borne to battle.

The diversity of Fs. carried in medieval armies had necessarily to be replaced by greater uniformity when standing armies were introduced. At first each company of the regiment had its distinctive colour, but in the reign of William and Mary the number of Fs. in the regiment was reduced to three, and later by Queen Anne to two, the royal and regimental colours, which number is still maintained. The foot guards have, however, remained unaffected by these innovations, and still retain a separate colour for each company. The regiments of household cavalry have each three regimental colours besides the royal standards, the dragoons have the usual two colours, while the lancers and hussars have no colours.

The use of Fs. is far more extensive on sea than on land. Formerly ships sailed under the individual Fs. of their captain, or the port of origin, but now they sail under the national colours. Usually the ruler of a country has a F. personal to himself known as the royal standard, though it is generally rectangular like the banner. The royal standard of the Brit. Isles bears the quartered arms of England and Scotland, and formerly Ireland. It is flown at the place where the king resides and on certain occasions of national celebration. The union F. was introduced in 1606 after the union of England and Scotland, and at first bore the crosses of St. George and St. Andrew. It was ordered by James I. to be borne at the maintop of all Brit. ships, except ships of war, which bore it upon their jack-staff at the end of the bowsprit, whence it is erroneously termed Union Jack. With this F. was afterwards merged, at the union with Ireland in 1801, the cross of St. Patrick, a red saltire on a white ground, and the F. thus formed has become the national F. It is still used as the man-o'-war's jack, and is also flown at the maintop of the admiral's vessel. It also appears on all ensigns. The ensign is the F. flown upon the ensign staff of every vessel indicating its nationality. Formerly the Brit. red, white, and blue ensigns were distinctive of the red, white, and blue divs. of the fleet, but in 1864 these divs. were done away with and new

uses allocated to the three ensigns. The white ensign, a white F. bearing the cross of St. George and with the upper corner near the staff occupied by the union device, is the exclusive F. of the Royal Navy and the Royal Yacht Squadron, and may be flown by no other vessel. The red ensign is a red F. with the union device in the upper quarter near the staff and is flown by Brit. merchant vessels and ships not belonging to the navy. The blue ensign is a plain blue F. with the union device in the upper quarter next the staff, and is flown by the Royal Naval Reserve, and by certain yacht clubs. The union F. and the blue ensign are also used with various additions to denote various officials or depts. Thus dominion war vessels fly the blue ensign with the dominion badge in the fly, while the F. for the colonies is the union F. with a white escutcheon in the centre, which bears the arms of the respective colony. The F. of the Lord High Admiral is red with a golden anchor and cable, the admiral's F. a cross of St. George, red upon white ground, flown at the main-mast. The vice-admiral flies at the fore-mast a similar F., but with one red ball in the upper quarter near the staff, and the rear-admiral flies at the mizzen-mast the same F. with a red ball in each of the quarters near the staff. A commodore flies a broad pennant, a swallow-tailed F. tapering towards the fly, and bearing the St. George's cross, while other officers commanding ships of war fly the long pennant, a very long, narrow, and tapering F. bearing a red cross on white ground.

The Eire national F. has three stripes, green, white, and orange, of equal width, the green being nearest the pole.

The F. of the union of S. Africa was altered from the Union Jack and defined by an Act of the Union Parliament in 1927. It now comprises both the Union Jack, to denote the association of the union with the other members of the group of nations constituting the Brit. Commonwealth, and the national F. the design of which is three horizontal stripes of equal width from top to bottom, orange, white, blue. In the centre of the white stripe the old Orange Free State F. hangs vertically, spread in full, with the Union Jack adjoining horizontally, spread in full towards the pole, and the old Transvaal Vierkleur adjoining horizontally spread in full away from the pole, equidistant from the margins of the white stripe. The Australian national F. is blue with the stars of the S. Cross in white, and the union F. in the top corner nearest the pole. The Canadian national F. is red with the dominion emblem in the centre and the union F. in the top corner nearest the pole. The New Zealand (Merchant) F. is red with the S. Cross stars in white and the union F. in the top corner nearest the staff. The national F. of the dominion of India is a horizontal tricolour with bands of deep saffron, white, and dark green in equal proportions; on the centre of the white band is an Asoka wheel in navy blue. The national F. of Pakistan is dark green, with a white vertical bar at

the mast, the green portion bearing a white crescent in the centre and a five-pointed heraldic star.

The Fr. F. is the tricolour of blue, white, and red in vertical bars adopted during the revolution, and is used both in the navy and the mercantile marine. Before the revolution the royal standard was a blue F. bearing three *fleurs-de-lis*. During the two empires the imperial standard was the tricolour, powdered with golden bees, and having the imperial eagle upon the white bar.

The Ger. imperial standard had a black iron cross with broadening arms, known as the cross patée, upon a gold field, each quarter of which was charged with a black crown and three black eagles, while the centre of the F. bore a gold shield, surmounted by a cross and surrounded by a collar of the black eagle. Within the shield were the imperial arms. The naval F. had a white ground bearing a black, white-edged cross, in the centre of which was the Prussian eagle in black on a white circular ground. The upper canton next the staff was divided into three horizontal bars of black, white, and red, upon which rested the black, white-bordered iron cross. This standard during the Nazi regime of Hitler was replaced by a black swastika within a white circle placed in a red ground.

The old Austrian imperial standard had a golden field, bearing the double-headed eagle of the empire with an indented border of gold, silver, blue, and black. After the union with Hungary the combined F. of Austro-Hungary consisted of three horizontal bars of red, white, and a bar divided vertically into two half bars of red and green, with two shields over the centre white bar, containing the arms of Austria and Hungary respectively. After the First World War the Austrian F. design was changed to three horizontal bars of red, white, and red.

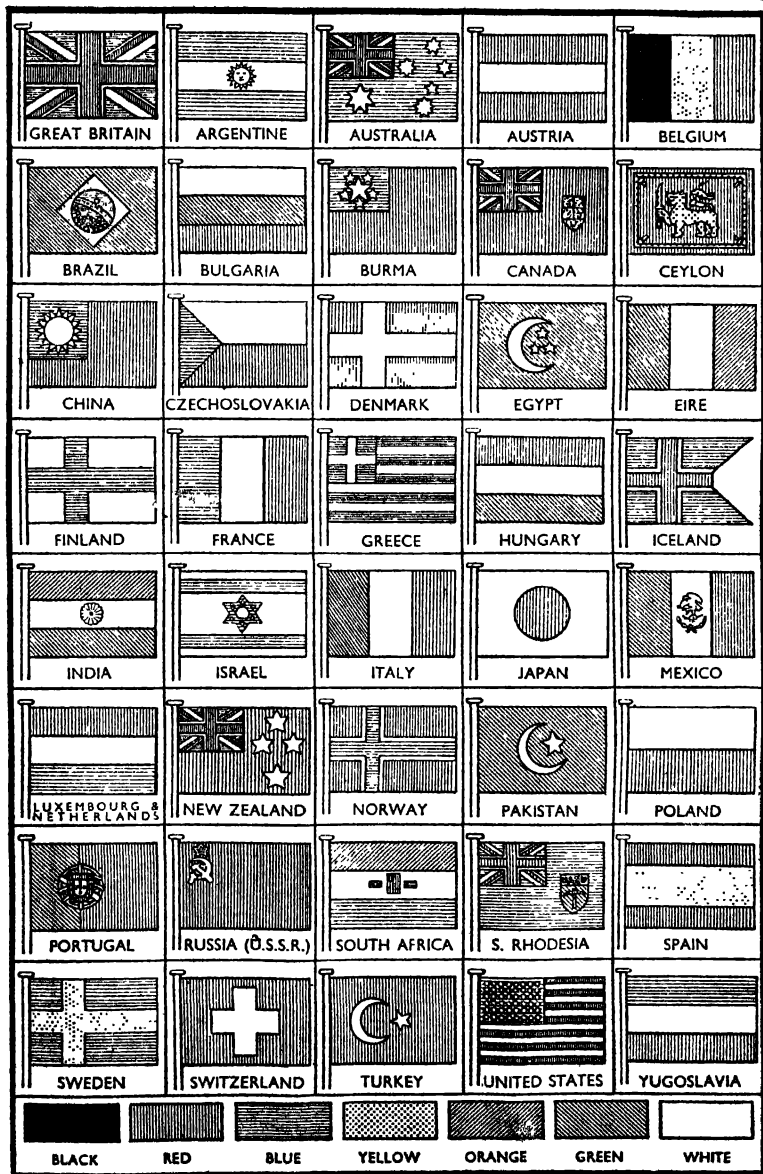
The old Russian imperial standard was yellow, bearing the arms of the empire, and the naval F. was simply a blue diagonal cross, or saltire, on a white ground. The Russian or Soviet F. is red with a yellow sickle crossing a yellow hammer, surmounted by a five-pointed star.

The Hungarian F. now has three horizontal bars, red, white, and green, with the Hungarian arms, without supporters, in the centre.

The It. royal standard until the country's adoption of a republican form of gov. was a white F. with blue border, bearing the arms of the king of Italy. The national F. has three vertical bars of green, white, and red.

The old Sp. standard bore the royal arms and the naval F. had red, yellow, and red horizontal bars; the middle bar bearing, near the staff, a circular shield with the arms of Leon and Castile surmounted by a crown. The mercantile F. is yellow with two narrow horizontal red bars. The republican F. in the Civil war had three equal bands—red, yellow, and violet.

The Portuguese F. (since 1910) is of



SOME NATIONAL FLAGS

dark green (next pole) and bright red in the proportion of five green to eight of red. On the red and green ground, half in each, is a shield, and on it representations of spheres and castles.

The Norwegian F. is red, with a blue cross bordered with white, the Swedish F. is blue, with a yellow cross. Both Fs. are square for mercantile vessels, but swallow-tailed for standard and navy, with the arm of the cross projecting between the tails and pointed.

The Belgian naval and mercantile F. has three vertical bars, black, yellow, and red. The standard is the same, with the royal arms in the centre.

The Dutch naval and mercantile F. has three horizontal bars, red, white, and blue. The standard is the same, with the royal arms in the centre.

Luxembourg's F. is red, white, and blue. The Dan. F. is red, with a white cross, swallow-tailed for the navy, and rectangular for the mercantile service. The standard bears a square in the middle with the royal arms.

The F. of Iceland is blue, with white-bordered red cross.

The Turkish naval F. is red with a white crescent and an eight-pointed star near the staff. The mercantile F. is green with a white crescent upon a red circle in the centre.

The Gk. standard has nine horizontal blue and white stripes, while the upper quarter near the staff is blue, with a white cross, in the centre of which is a crown. The mercantile F. is identical without the crown.

The Rumanian F. has three vertical bars of blue, yellow, and red.

San Marino, two horizontal bands, white and blue, with the republican arms in centre.

The Finnish F. is white with blue horizontal cross extending to the width and length of the F.

The Polish F. consists of two horizontal stripes, white and red, of equal width, with the white uppermost.

The Swiss F. is red, with white cross in the centre.

The Czechoslovak F. has a blue triangle within the square extending from the pole, with an apex in the centre of the F., the top portion of which is white and the remainder red.

The Yugoslav F. has three horizontal stripes of equal width, blue, white, and red, with blue uppermost.

The Bulgarian F. has three horizontal stripes of equal width, white, green, and red, with the white uppermost.

The Albanian national F. is red, with a black double-headed eagle. The mercantile F. is red, black, red in horizontal stripes.

The U.S. F. consists of thirteen red and white stripes, representing the original number of states, with the upper inner quarter blue, bearing one star for every state actually in the union. The number of stars is now forty-eight. Two stars were added in 1912 for Arizona and New Mexico.

Cuban national, oblong with red tri-

angle next to staff extending one-third of F., containing a five-pointed star in centre, the rest of the design being five horizontal stripes of equal width, blue and white alternately with blue uppermost.

The Mexican F. is a tricolour with green, white, and red vertical bars, bearing the Mexican arms in the central bar. Costa Rica: five horizontal bands, blue, white, red, white, blue (the red band twice the width of the others). Dominican republic: red and blue, with white cross. Guatemalan: three vertical bands, blue, white, blue. Haitian: two horizontal bands, blue and red. Nicaraguan: three horizontal bands, blue, white, blue with the republican arms on the white, displaying five volcanoes, surmounted by cap of liberty under a rainbow. Salvador: three vertical bands, blue, yellow, red. Panama: four diagonal squares—two white, one blue, and one red, with the five-pointed blue star in the middle of one white square and a red star in the other white square.

The Brazilian F. is a green F. bearing a yellow rhombus. In the rhombus is a blue circle dotted with stars and bearing the motto 'Ordem e progresso.'

The Argentine F. has three horizontal bars, blue, white, and blue, for the mercantile service, and a sun upon the white bar for the navy.

The Chilean F. consists of two horizontal halves, white and red. Near the staff in the upper bar is a five-pointed white star on a blue ground. Peruvian: three vertical bands, red, white, red. Colombian: three horizontal bands, yellow (twice the width of the others), blue, red. Bolivian: three horizontal bands, red, yellow, green. Venezuelan: three horizontal bands, yellow, blue, red (with seven white stars on blue band). Paraguayan: three horizontal bands, red, white, blue (with the republican arms on white band). Uruguayan: four blue and five white squares (surcharged with rising sun, next flagstaff). Ecuadorian: three horizontal bands, yellow, blue, and red (yellow twice the width of the others). The Jap. F. is a red central disk, representing the sun, with red spreading rays on a white ground. The Chinese F. is red, with a blue first quarter bearing a white sun with spreading rays.

Other Fs. are: Persian (man-of-war): white, bordered with green (top) and red (bottom), with arms—lion and sun—in centre. Siamese: five horizontal stripes, red, white, blue, white, and red, of equal width, with an elephant as centre emblem. Egyptian: green, with one white crescent, and three five-pointed white stars, arranged as an equilateral triangle, between the horns. Ethiopian: three horizontal bands, green, yellow, red. Afghanistan: green, red, and black, with white device in centre. Saudi-Arabian: green oblong, white device in centre: 'There is no God but God, Mahommed is the Prophet of God,' and a white scimitar beneath the lettering. Moroccan sultan's F. is red, with green pentagram (the seal of Solomon). Syrian: black, white, and green, with white stars. Lebanon F.

is blue, white, and red, with a cedar of Lebanon on white stripe.

A white F. is the 'E' of truce, a yellow F. denotes quarantine, a red F. mutiny, and a black F. piracy. For the use of Fs. for signalling see SIGNALLING.

See G. C. Housell, *Flags of all Nations* 1874; H. H. Horner, *American Flags* 1810; W. J. Gordon, *Flags of the World*, 1928; G. Perreux, *L'Origine du drapeau rouge en France*, 1930; and E. H. Baxter, *National Flags*, 1934.

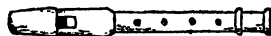
Flag, in botany, the popular name of two species of Iridaceae found in Great Britain. *Iris pseudacorus*, the yellow or water F., grows in marshes and ditches. *I. foetidissima*, the stinking iris, grows in hedges and is of a purple colour. This name is also given to the tall blue irises of the U.S.A., *I. versicolor*, *I. prismatica*, etc.; and with a qualifying adjective to sev. other similar plants, *Gladiolus segetum*, the corn F., *Acorus calamus*, the sweet F., etc.

Flag-captain, captain of the admiral's ship in any squadron or detachment of the navy and is commonly the admiral's nominee.

Flagellants, **The**, is the name given to groups of religious fanatics who during the thirteenth and fifteenth centuries urged and exaggerated the efficacy of self-inflicted scourging by way of atonement for sin. This doctrine had been moderately put forward by many ascetics when suddenly in 1260 there sprang into public notice a certain monk of Perugia, Ranieri by name, who by his feverish enthusiasm prevailed on numbers of men and women to band themselves together and to march from vil. to vil. singing violently denunciatory hymns and halting at every square or crossways to flagellate themselves, so as often to draw blood and cause grave bodily hurt with a heavy knotted scourge, not infrequently loaded with iron or lead. Condemned in 1261 by the pope, this group died out, but later flagellation visited Europe in waves, usually after some great upheaval or crisis. Thus the outburst of 1260 was the result of the chaos produced in Italy by the unceasing struggles between Guelph and Ghibelline, whilst that of 1349 was directly traceable to the panic and despair which took hold of men's minds after the Black Death. The last formidable wave was that of 1414 which subsided in the burning of the leader, Conrad Schmidt, and in the punishment of his followers by the intemperate inquisition.

Flageolet, musical wind instrument of the recorder family, resembling the flûte à bec, beak flute, or ripple flute, but with two of the six holes of that instrument at the back and closed with the thumbs. In shape it is a small pipe with a mouth-piece inserted in a bulb, and produces a shrill sound similar to, but much softer than, that produced from the flauto piccolo. Various said to have been invented in France and England, but it was certainly in vogue in England from the late seventeenth to the early nineteenth century. The obbligate in the song 'O, ruddier than the cherry' in Handel's *Acis*

and *Galatea* is for a F. Mozart wrote a part for the F. in G in his *Entführung aus dem Serail*, but as the instrument is obsolete in the orchestra this part is now played on the piccolo. The ordinary six-holed tin whistle, which is a popular form of F., gives a good idea of the appearance and tone of its orchestral prototype. The F. is also an organ stop of 2 ft. scale, and wood pipes. F. tones are produced upon instruments of the violin type by drawing the bow very lightly over the strings.



FRENCH OR TRUE FLAGEOLET
back and front views

Flag-lieutenant naval officer who transmits by signal or word of mouth the admiral's commands to the various ships. He is attached to his admiral exactly as in the army the aide-de-camp is to his general.

Flag-officer ranks above a captain in the Brit. Navy, and is usually a rear-admiral, vice-admiral, or admiral. He is so called because he is privileged to hoist a flag at his mast-head instead of a pennon, the flag being invariably a red St. George's cross on a white ground. A rear-admiral carries it at the mizzen, a vice-admiral at the fore, and an admiral at the main. To Fs. are given the commands of naval stations at home, and of fleets at home or abroad, whilst they may be entrusted with the surveillance of any important dockyard. They are appointed by the Admiralty at the king's pleasure.

Flagship, so-called because it flies the admiral's colours. In any naval engagement other members of the squadron naturally look to the F. for orders.

Flag-signalling, or **Flagging**, see SIGNALLING and SEMAPHORE.

Flagstaff, pole or staff upon which a flag is hung; a F. on land is more often a tall mast, permanently fixed, while that on board ship is generally the mainmast, or at the stern.

Flagstaff, tn. of Arizona, U.S.A., the cap. of Coconino co., situated 84 m. E. of Prescott junction. Large stock raising dist. There are lumber mills, excellent yellow pine being produced. In the city are the Lowell Observatory and the headquarters of the Coconino Forestry Service. Pop. 5000.

Flagstones (geology), thin beds of sandstone which lend themselves to quarrying in slabs suitable for paving stones or rough slating. In the N. of England a flagstone quarry is synonymous with a slate quarry. The best F. are quarried from the Orcaidian or Middle Old Red sandstone of Caithness and Orkney. Other good F. are the Carboniferous F.

of the N. and midland cos. of England; while certain Jurassic rocks also yield good F.

Flahaut de la Billarderie, Auguste Charles Joseph, Comte de (1785-1870), Fr. general and diplomatist, the son of Mme de Souza, took the name of her first husband, Flahaut de la Billarderie, who was executed in the Reign of Terror (1793), although it is generally believed that Talleyrand was his father. From 1800 till Waterloo he was continually in active service, fighting at Landbach (1805), Friedland and Leipzig (1813), and having served with distinction in the Russian campaign (1812). His liaison with Hortense de Beauharnais, queen of Holland, was the result of a devoted attachment. Having taken part in an unsuccessful attempt to put Napoleon II. on the throne, he finally retired to England, where he married Margaret Elphinstone, afterwards Baroness Keith in her own right.

Flambard, Ranulf (Ralph) (d. 1128), chief justiciar in the reign of Wm. Rufus; was a Norman of obscure birth, who began life by being at the same time priest and lawyer. After Lanfranc's death, in 1089, he insinuated himself into his place as the king's chief adviser, and soon made himself odious to clergy and laity alike by his infamous, though ingenious, devices for enriching his master's exchequer. A favourite means was arbitrarily to keep a see vacant that the king might pocket the revenues. In 1099 he became bishop of Durham, but when Henry I. came to the throne he was imprisoned in the tower. Having made good his escape he took part in Robert's rebellion of 1101. Notwithstanding this treachery he regained his bishopric, and was honoured as a founder of the cathedral.

Flambé, form of lustre ware, generally yellow or red, with flame-like splashes of blue, mauve, or other colours, giving changing tints from different viewpoints. It originated in blemishes in red glaze, and was first made by Chinese potters.

Flamborough Head (A.-S. *Flamburg*). Domesday Book *Flaneburg*; derivative from *Flein's burg*, headland on the coast of Yorkshire, England, situated 2 m. E. of Flamborough. It is composed of limestone cliffs, and extends a considerable distance into the sea, rising in places to a height of 400 ft. Formerly beacons were lighted on the summit, and now a lighthouse, the light of which is visible at a distance of 25 m., stands 214 ft. above high-water mark.

Flamboyant, adjective used to describe the last phase of Gothic architecture in France during the fifteenth and sixteenth centuries. It corresponds to the Perpendicular style in England, and the name refers to the flame-like curves and flowing lines which characterise the window tracery of the period. Generally speaking, F. work is *snick* and beautiful in detail rather than in the whole effect, and is related to the finest Gothic architecture just as later Gk. statuary is to the masterpieces of Phidias. Broad surfaces are left bare, minute ornamentation being

crowded into insignificant corners and spaces. Interpenetration, that is, the interlacing of base mouldings, is an ingenious and intricate rather than a beautiful feature of this style.

Flame (Lat. *flamma*, from root *flag*; cf. *flagrare* and *φλέγειν*) can be defined as a gas which is temporarily luminous as a consequence of chemical action. The common distinction which is drawn between luminous and non-luminous Fs. is not scientific, and can only be taken as representing a rough estimate of the degree of luminosity. Fs. can also be induced by the medium of electricity; rapidly alternating high-tension discharges in air will produce an oxygen-nitrogen F., which cannot be distinguished from a F. produced by ordinary means.

Structure of Flames.—The term structure, as applied to Fs., is somewhat vague, and different accounts are given as to the number of differentiated parts in various Fs. The shape of Fs. as a rule is that of a hollow cone. The gas which is unburnt forms the interior of the cone and the other gas surrounds it in the case of Fs. produced simply by the reaction of two gases. The Fs. of the compounds of carbon, and especially of hydrocarbons, have received more attention and been more studied than other kinds, as is natural, owing to their extensive use and application. The cone of F. is simple when such elementary gases as oxygen and hydrogen only unite, but consists of two or more parts in more complex cases. At the base of a candle F. is a blue portion which forms the rudiment of an inner cone of combustion. When no air is mixed with the gas before coming out of the burner, no clear differentiation of the structure can be observed in a carbon-monoxide F. Hydrogen, when burnt in air at ordinary pressure, has very little luminosity or colour. The F. of cyanogen is peculiar in structure, consisting of a shell, almost crimson in colour, surrounded by a margin of bright blue. These two colours mark two stages in the process of combustion, as the carbon of the gas is oxidised first to carbon monoxide and then to carbon dioxide. If the gas of a hydrocarbon is supplied with sufficient air before leaving the burner, as in the case of the blast blow-pipe, the result is a sheet of undifferentiated F., blue in colour.

Luminosity of flames is caused by various reasons, of which the presence of solid incandescent matter in the F. is one. In some cases the solid is put into non-luminous F., which it renders luminous, as in the case of the incandescent gas mantle and the limelight. In the candle, oil, and coal-gas Fs., small particles of carbon, set free by the decomposition of the hydrocarbons form the chief cause of luminosity. In many Fs., however, solids are absent, and the luminosity is still great. Such are the Fs. of oxygen and hydrogen under pressure, carbon disulphide, nitric oxide, etc. With an ordinary hydrogen F. luminosity is diminished as the purity of the hydrogen is increased and as the air is freed from dust. High temp. may increase the luminosity of Fs., in which

are no solids, as in the case of coal-gas in a regenerative burner, or the same result may be obtained by increasing the density of the F. gases by pressure, as in the case of a hydrogen and oxygen F. The Bunsen burner is an illustration of the converse of the above process. Combustion in this case is rendered more complete by the addition of air to the inside of the F., but the pressure is reduced by the consequent admixture of nitrogen and oxygen, and the luminosity is thus lessened. So in the case of an ordinary gas F., if instead of air, nitrogen, or carbon dioxide is admitted to the interior of the F., the latter can be rendered practically non-luminous. The chemical energy required for the production of F. may be liberated in the process of either decomposition or combination of the component gases; the latter is the more usual, but gun-cotton is an instance of the former, as it gives off a F. in the process of decomposition. F. temps. have been measured in many ways, one of the best being the use of a platinum and platinum-rhodium thermocouple. The normal Bunsen F. is about 1870° C., the oxyhydrogen blowpipe 2420° C., the acetylene F. 2550° C., and the oxyacetylene blowpipe 3500° C. These may be compared with the temp. of the electric arc, which is about 3750° C.

Flame-Flower, or **Red-hot Poker**, popular name of the various species of *Kniphofia*, a genus of Liliaceae. They are hardy plants, suitable for cultivation in a light soil, and bear vivid scarlet flowers. Originally they came from S. and E. Africa.

Flamen (from Lat. *flare*, to blow up the altar fire), in anct. Rome the title of sacrificial priests. The chief or majores were the F. Dialis (priest of Jupiter), F. Martialis, and F. Quirinalis, who were always patricians, whilst the other twelve were chosen from the plebeians and were consequently known as minores. Their supreme function was daily sacrifice, and on Oct. 1 the majores invariably offered oblations on the Capitol to Fides Publica. A woollen mantle, called the *lena*, a white conical hat, the apex, and a laurel wreath or olive branch were their distinctive dress. Like the pope the F. Dialis was hedged round by many restrictions; e.g., he might never leave the city for a night or look at an army, nor mount a horse. His wife, known as the *flaminica* Dialis, helped him to dispense his religious duties.

Flame-thrower, military weapon, used in Byzantium, mainly as a siege and naval weapon, by special troops known as *σφοδισταί* (see GREEK FIRE). In the First World War the weapon was first introduced by the Gers., notably at Verdun (*Flammenwerfer*). Brit. and Fr. portable (infantry) and static copies were developed. The charge is a mixture of inflammable oils, the propellant compressed air or gas. Flame-throwing tanks employed by the Ita. In the Abyssinian campaign of 1935 consisted of a trailer-mounted F., towed by a light tank, but some flame-throwing tanks were used by the Gers. (converted *Panzer-*

kraftwagen II.) and Brit. in the Second World War.

Flamingo (from Lat. *flamma*, flame), name given to a genus of beautiful birds belonging to the family Phoenicopteridae, of the order Odontoglossi. They inhabit the most of the countries bordering on the Mediterranean, a few individuals occasionally travelling as far as the Brit. Isles and N. Germany. By its long neck and legs, as well as by its internal anatomy, the F. gives evidence of an ancestral connection with the storks. There are nine existing species of the *Phoenicopterus*, and these constitute the true F. *Ph. roseus*, the European F., common in the S. of France and in Spain, has plumage of a pinkish-white, with scarlet wing coverts; the beak is rosy-red at the base and black



FLAMINGO

at the tip; and the legs and feet are light vermillion. *Ph. ruber*, the Amer. F., has an entire plumage of vermillion. Large flights of these birds, travelling, as they do, over the lakes, present a most beautiful spectacle. The F., though essentially a wader, is also a powerful swimmer. It feeds on small aquatic animals and water-plants. See E. Gallie, *The Flamingoes of the Camaguey*, 1948.

Flaminian Way, or **Via Flaminia**, was the great trunk road which in Rom. times led for 222 m. northward from the metropolis to Ariminum on the Adriatic. Literature is full of allusion to it, which is not surprising, as it was a famous thoroughfare alike for travel and for commerce. A wayfarer leaving Rome would pass in turn through Oricoll, Narnia, Sangemini, Carsulae, Mevania, and Forum Flaminii. In time he would reach Nuceris and after ascending the pass over the Apennines would descend to Caes. Here his road bore round in a N.-easterly direction, and he would finally reach Forum Fortunae on the coast, whence he would turn N.-westward through Pisaurum on to the busy port of Ariminum. Some of the paving stone and the bridges or, at least,

their pliers still remain *in situ*. It was built during the censorship of Flamininus (220 B.C.), whence the name.

Flamininus, Titus Quinctius (c. 228–174 B.C.), Rom. statesman and general, secured the faithful support of the Gks. against Philip V. of Macedon, from whose oppressive yoke he rescued them, his victory at Cynoscephalæ in 197 being the decisive engagement. His somewhat hollow gift of independence and liberty to his allies gained him the title of 'deliverer and father of Greece.'

Flamininus, Gaius, Rom. democratic leader and general, granted during his tribunate of 232 B.C. a stretch of newly acquired land, 'ager Gallicus Picenus,' to the plebeians in direct opposition to the senators' wishes, and later built for them the Circus Flamininus on the Campus Martius. In 223 he gained a notable victory over the Insubres on the banks of the Addua, but in 217 he was slain during the Punic wars in the battle of Trasimene Lake into which he had foolishly allowed the astute Hannibal to entrap him. See also FLAMINIUS WAY.

Flammarion, Camille (1842–1925), Fr. astronomer, b. at Montigny-le-Roi, was entered in 1858 at the Paris Observatory as an astronomical student and worked for four years in the Bureau des longitudes, where he assisted in the compilation of a scientific nautical almanac. For some time he ed. the scientific columns of the *Siècle*, and soon became known as a popular lecturer on astronomy. In 1868 he made sev. ascents in a balloon in order to investigate aerial currents and the hygrometry of the atmosphere. Two years later he pub. an important work on the movements of celestial bodies, and in 1880 was awarded the Montyon prize of the Fr. Academy for his *Astronomie populaire*. One of his most important discoveries is that the rotatory movements of the planets are governed by the effect of gravity upon their various densities. *Pluralité des mondes habités* (1862), *Les Merveilles célestes* (1865), *Voyages aériens* (1868), *Dans l'infini* (1872), *Atlas céleste* (1877), *Les Comètes, les étoiles et les planètes* (1880), and *La Planète Mars et ses conditions d'habitabilité* (1893) are some of his many pub. Towards the end of his life he became much interested in the question of immortality and pub. sev. curious books dealing with it.

Flamsteed, John (1646–1719), b. at Denby, near Derby, first astronomer royal of England, showed a lively interest in the heavens whilst still a boy, and was delighted to find himself installed in 1676 in the Royal Observatory at Greenwich, then just completed. Largely self-taught, he left school before he was sixteen, and laboured with single-minded devotion for forty-four years at Greenwich Observatory from its foundation. At first he was harassed by lack of funds, and gladly supplemented his £100 a year by teaching and by taking holy orders, which enabled him to obtain the small living of Burstow, near Horley, in Surrey. The three vols. of his *Historia celestis Britannica*, which did not appear till 1725, contained a

record of all his astronomical observations and also the *British Catalogue* of nearly 3000 stars. Unfortunate bickerings with Sir Isaac Newton, who depended on F. for data in support of his lunar theory, cast a heavy shadow over the worthy astronomer's later years. F.'s name will always be honoured as the first great Brit. observer who estab. precise astronomy on secure foundations. The great tasks that F. undertook were, first, the construction of a catalogue of the fixed stars more extensive and more precise than any then existing; secondly, the systematic observation of the sun, moon, and planets with a view to revising the theories of their apparent motions and to constructing tables from which their positions could be computed with the desired accuracy. Those tasks were far beyond the capacity of one man, but as no assistance was provided by the gov. F. had to defray the cost of it out of his own pocket. He introduced new methods into practical astronomy, many of them still in use to-day. In accuracy his observations far exceeded those of his predecessors or contemporaries; they were, in fact, the earliest observations from which the phenomenon of aberration (q.v.) was clearly deducible. The task which he did not live to finish was completed by the labours of Crosthwait and Shart, who had been his private assistants.

Flanders (Flem. *Vlaanderen*, Fr. *Flandre*), former name of a co. of Europe, which in the seventh century was applied only to Bruges and its surroundings, but it later extended along the North Sea from the Scheldt to the straits of Dover and Calais. It comprised the N.W. part of present Belgium, with a S. portion of the Netherlands, and a N. portion of France.

History.—The country was originally inhabited by Celtic tribes, the Morini and Menapii, who were subjugated by Cæsar's forces, and the land became incorporated with Rom. Gaul. In the early centuries A.D. F. was overrun by invaders, many of the Franks taking up their abode permanently. By the treaty of Verdun in 843 F. was assigned to Neustria, or W. Francia, under Charles the Bald. F., though virtually a suzerainty of France, was politically autonomous, being governed by the counts of F. The first count whose name is recorded in hist. is Baldwin I., *Bras-de-fer* (840–79), the son-in-law of Charles the Bald. The early counts were very much occupied in guarding their lands from the attacks of predatory northmen, and in extending their own dominions. Baldwin III. (d. 962) laid the foundations of F.'s future commercial and industrial prosperity by establishing the first weavers and fullers at Ghent, and by patronising the ann. fairs in the chief Flemish cities. Baldwin IV. (988–1035) obtained Valenciennes in 1006 from Emperor Henry II., thus becoming a feudatory of the empire as well as of the Fr. crown. During the rule of Baldwin V. (1035–67) the cos. of Alost (Aalst), Tournai, and Hainaut were added to the principality. The counts of the

eleventh and twelfth centuries were zealous in promoting the industrial interests of the country. Count Philip (d. 1191) encouraged the development of the free towns, and conferred certain municipal privileges on a number of seaports. On his death the countships of F. and Hainault, which had been separated during the rule of Baldwin VI., were now reunited. Baldwin IX. (1194-1205), the founder of the 12th empire of Constantinople, was succeeded by his two daughters, Johanna and Margaret. It was during this reign that France began to exercise undue influence in the country, and attempted to deprive the people of many of their rights. Philip the Fair invaded the country during the reign of Margaret's son, Guy of Dampierre. Together with his two sons and his nobles Guy was taken prisoner, and F. established as a Fr. dependency. The sturdy Flemish burghers rose in insurrection, and under the leadership of Peter de Conynne, a master cloth-weaver of Bruges, routed the Fr. army at Courtrai (1302). The cities increased in power and wealth, and many of them were governed locally on democratic principles. The internal struggle for superiority between the chief cities often disturbed the country with civil war. In the middle of the fourteenth century Jacob van Artevelde was the virtual ruler of F., and persuaded his countrymen to make an alliance with Edward III. of England in defiance of their count. In a plot Jacob was murdered (1345), and the count of F. Louis van Male came to power. The last resistance of the cities was broke at Ghent in 1349. Under Philip van Artevelde, Jacob's son, Ghent rebelled again, until he, too, was slain at Rosbroeke (1382). By the marriage in 1369 of Margaret, the heiress to the countship, and of Philip the Bold, of Burgundy, the hist. of F. became intimately connected with that of Burgundy, until in 1477 F. became part of the Austrian Netherlands. The Flemish cons. still attempted to assert their rights in defiance of their rulers, but the Burgundian dukes, while promoting Flemish industry and trade, sternly repressed any revolts against their authority. In 1526 France was obliged to yield her right of suzerainty in favour of Austria, and in 1633 F. reverted to Sp. rule. From 1659 to 1713, by the treaties of the Pyrenees (1659), Aix-la-Chapelle (1668), Nijmegen (1678), and Utrecht (1713), S. portions of the country were assigned to France, under the name of Fr. F. By the treaty of Vienna in 1815 it was incorporated in the Netherlands. In 1830 the new kingdom of Belgium was formed, and the old name of F. was retained in the two provs., E. and W. F.

E. F. lies to the N.W. of Belgium, extending to the neighbourhood of Antwerp. It has rich and fertile soil, being well watered by the Scheldt and the Lys. The chief tns. are Ghent (the cap.), Dendermonde, Oudenaarde, Eecloo, St. Nicolas. The prov. is famous for its flax, and the inhab. manuf. cloth, paper, leather, etc. Market-gardening is carried on under excellent conditions. Area 1147 sq. m. Pop. (1947) 1,212,103.

W. F. borders the North Sea for about 40 m. Like its neighbouring prov., the country is flat and the soil very productive. Agriculture and cattle breeding are the chief occupations of the inhab., Flax, hops, and tobacco are cultivated. The pop. is also engaged in fishing and in weaving, spinning, lace-making, bleaching, etc. The chief tns. are Bruges (q.v.) (the cap.), Ostend (q.v.), Ypres (q.v.), Courtrai, and Furnes. Area 1249 sq. m. Pop. (1947) 990,873. See also BELGIUM; EAST FLANDERS; WEST FLANDERS.

Flemish Language and Literature.—Flemish belongs to the Teutonic group of the Indo-Germanic or Indo-European family. It is thus closely connected with Ger. and with Eng., all having grown out of the same Teutonic stock. Together with the Dutch tongue it is generally called Netherlandish. There is very little documentary evidence of Old Netherlandish apart from an interesting trans. of the Psalms. The literature of Middle Netherlandish, which developed about the eleventh or twelfth century, is particularly rich in romances and fables, among the former being *Karel ende Elegast* and *Floris en Blanceflor*, the chief among the latter *Reinart*. Among the mystics of the fourteenth century Ruysbroek was the most important. New Netherlandish, or Dutch, dates from the early fifteenth century. The love of literature and pride in the national tongue were promoted by the formation of *Kamers* or literary clubs. One of the oldest, the *Violier*, at Antwerp still exists. During the seventeenth and eighteenth centuries, owing to historical reasons, the literary activity was nearly completely concentrated in the Dutch provs. But at the beginning of the nineteenth century, after the separation of Belgium from the Netherlands, there was a great revival of letters. The Flemish language had been largely superseded by Fr., and was regarded almost as a patois. The pioneer of the new movement was Willems (1793-1846), who aroused interest in Flemish literature by editing the old classics, and by founding in 1834 a literary organ for Flemish writers. The novelist Hendrik Conscience (1812-83) and the poet, Guido Gezelle (1830-99) were the outstanding figures of this period. They prepared a new and most fertile literary activity. Among the poets of the modern school should be noted A. Rodenbach (1856-80), Pol de Mont (1857-1931), P. van Langendonck (1862-1920), K. van den Woestijne (1878-1929), P. van Ostayen (1896-1929), and M. Gijzen (b. 1899), and among the novelists are numbered C. Buysse (1859-1932), S. Streuvels (b. 1871), A. Vermeylen (1872-1945), M. Sabbe (1873-1938), H. Teirlinck (b. 1879), A. de Ridder (W. Elschot) (b. 1882), F. Timmermans (b. 1886), M. Roelants (b. 1896), and G. Walschap (b. 1898).

See also BELGIUM; FLEMINGS IN ENGLAND; FLEMISH ART; (1914-18 campaigns); FRANCE AND FLANDERS, FIRST WORLD WAR CAMPAIGN IN; for the 1939-1945 campaign see WESTERN FRONT IN

SECOND WORLD WAR and FLANDERS, BATTLE OF (1940).

See P. Hamelius, *Histoire politique et littéraire du mouvement flamand*, 1894; F. de Baeker, *Contemporary Flemish Literature*, 1934; R. van Roosbroeck (ed.), *De Geschiedenis van Vlaanderen*, 1936-39, 1948; F. Baur, A. van Duinkerken, and others, *Geschiedenis van de Letterkunde der Nederlanden*, 1939-48; J. Donucé and J. A. Goris (ed.), *Vlaanderen door de Eeuwen heen*, 1932; J. A. Goris (ed.), *Belgium*, 1945; and H. Smith (ed.), *A Dictionary of Modern European Literature*, 1947.

Flanders, Battle of (1940), fought between May 10 and June 2, 1940, and begun with a simultaneous attack by the Gers. on Holland, Belgium, and France. During these fateful weeks the Brit. Expeditionary Force, under Lord Gort, advanced into Belgium, and fell back again when the Gers. pierced the Fr. armies and the Belgians capitulated, and finally fought its historic retreat to Dunkirk, where 211,532 fit men, 13,053 casualties, and 112,546 allied troops were embarked. Lord Gort, who was under the immediate orders of Gen. Georges, commanding the Fr. front of the N.E., had no responsibility for the plan to meet a Ger. invasion of the Low Countries. There were strong arguments in favour of that which was adopted, the wheel to the Meuse-Dyle line (the so-called Dyle plan) as against a shorter wheel to the Escaut, or remaining on the frontier with mobile troops thrown out to the Escaut. But its advantages depended on other conditions, such as the capabilities of the Belgian Army and the mobility of the Fr. reserves, conditions which were not fulfilled.

When the Ger. attack was launched on May 10 the advance through Belgium was carried out successfully, but the comparatively slight interference attempted by the Ger. Air Force was in itself a warning. Danger loomed nearer on May 15, when the Dutch Army capitulated. The excellent Fr. troops of the Seventh Fr. Army, who had rushed up to Holland, had to retire hurriedly on Antwerp. Sev. divs. of them were ordered to pass right across the communications of the B.E.F., and of their own First Army, and try to secure the disintegrating Ninth Army. This complicated move was successfully carried out on May 18; but official dispatches record that it was too late. The divs. disappeared into the enemy maelstrom, and their fiery leader, Gen. Giraud, arrived only to be captured. As for the B.E.F., which was not seriously attacked up to the night of May 15, it was still conforming to the Dyle plan. But the enemy was moving ahead of schedule, and May 16 was the turning-point. The Gers. had broken through on the Meuse and the Fr. S. flank was imperilled. Gort therefore asked for and obtained orders from Gen. Billotte, commanding the army group, to withdraw by stages to the Escaut. The withdrawal involved the abandonment by the Allies of both Brussels and Antwerp. On the day May 17-18 began a phase of improvisation—for there was

confusion in high places, and co-ordination had too often failed—during which, while the main body of the B.E.F. was holding off the enemy in the N., desperate efforts were being made by detached and improvised forces first to hold the panzer thrusts through the rearward areas, and then to form a defensive flank to the S. But on May 18 the enemy reached Amiens, and cut the lines of communication with ports S. of the Somme, and his strength of five armoured divs. made it certain that he would reach the Channel ports. The loss of the line of the Somme also cut off the arriving armoured div. (Brit.), which thus never came under Gort's effective command, and also five battalions of the 12th and 46th Divs. (lines of communication troops), together with the 51st Div., which was rushing back from the Saar. The gap in the allied line ought to have been closed by counter-attacks from N. and S., but the Fr. had not sufficient reserves at their disposal, and the so-called Weygand plan—for a counter-offensive on a large scale from the N., while the Fr. First Army and the B.E.F. were to attack S.W. at the earliest moment with eight divs., and with the Belgian Cavalry Corps in support—existed only in theory, and the attack from the S. never materialised on any substantial scale. On May 20 orders were given to Gort to fight his way back S. to Amiens, carrying with him, if possible, the Fr. and Belgian Armies from the N. Lord Gort was obliged to point out that this course was impracticable, as he would have simultaneously to fight a rearguard action against a superior enemy, and to break through a superior enemy. He knew that the Fr. and Belgian Armies could not have conformed even if they would, and the B.E.F. no longer had the supplies for protracted operations. Probably the idea never would have been practicable. But a most gallant sortie on a smaller scale was made by two Brit. divs. in co-operation with Gen. Prioux and the Fr. Cavalry Corps (May 21). All through May 22 this force held on, hoping for further Fr. support which never came, and it was finally withdrawn. But if the attack could not develop at least it imposed a delay on the enemy which greatly contributed to the success of the evacuation from Dunkirk. On May 23 Calais was isolated. Its defence for over four days by the Royal Tank Regiment and the 30th Brigade under Brig. C. Nicholson, was a most gallant action, which held off effectively this claw of the Ger. attack from Dunkirk. (See also under CALAIS.) The Weygand plan was still in the air, and Weygand reported that the Fr. Seventh Army was advancing successfully, and that it had captured Péronne, Albert, and Amiens; but these reports of successful advances were, in fact, untrue. The Weygand plan, in so far as it existed at all, was quite impracticable. Nevertheless, plans for a counter-attack towards the S. were prepared to begin on May 26. But already on the 24th the enemy had driven in the Belgian line on the Lys, and the projected counter-attack never took

place. On May 26 plans were agreed for withdrawal by stages to the Dunkirk perimeter. During that day it was evident that the Belgian Army could not retire on the Yser, and that a gap would open between it and the H.V.F. Thereafter the plans for the final withdrawal from Dunkirk were put in hand. See further WESTERN FRONT IN SECOND WORLD WAR. Consult E. Keble Chatterton, *The Epic of Dunkirk*, 1940, and Lord Gort's Dispatches, *London Gazette*, Oct. 10, 1941.

Flanders, East, see EAST FLANDERS.

Flandrin, Jean Hippolyte (1809-64), Fr. historical and portrait painter, b. at Lyons. His fame rests chiefly on his monumental decorative work, of which the church of St. Germain-des-Prés offers fine illustration. For here hang in the sanctuary his great frescoes, 'Christ entering Jerusalem' and 'Christ going up to Calvary' (1842-44), and in the choir his figures of many saints and virtues (1846-1848). The cathedral of Nantes possesses his 'St. Clair healing the Blind,' and his pictures may also be seen in the churches of St. Paul at Nîmes, St. Vincent de Paul at Paris, and St. Martin d'Alnay at Lyons. He was much influenced by Ingres.

Flange, projecting rim or edge, used in engineering, machinery, building, etc., either to strengthen an object, or to afford means of fixing it to another object, or to serve as a means of guidance. The variety of Fs. is too great to be fully detailed here. A girder consists of a vertical web connecting horizontal parts called the Fs., which are necessary to its strength, and iron joists are a similar combination of web and Fs. The use of a F. for jolting purposes is seen in cast-iron pipes, the ends of which are joined by bolts passing through the F., while iron plates are also made with Fs. at all four sides to enable them to be bolted together. Such plates are used in the construction of the tubular tunnels for underground railways, the Fs. serving as ribs and strengthening the structure. The most frequent use of the F. for guiding purposes is to be seen in the tyres of tramcar or railway carriage wheels, where the Fs. prevent the vehicle from leaving the rail. A back F. is the plate placed over the end of a cylinder in order partly to close the aperture.

Flannan Islands, or Seven Hunters, uninhabited is. group of Scotland, in the par. of Uig, Ross-shire, situated 20 m. N.W. of Gallion Head, and consisting of seven is. and twenty rocks, the highest point reaching 282 ft. The group contains some interesting Caledonian ruins, which are estimated as dating from the early eighth century. Cragsmen frequent the is. in June to obtain the eggs of the elder ducks, gannets, and other sea fowl, which breed there.

Flannel, soft woollen textile, made usually from loosely spun yarn. The origin of the word is probably Welsh, as F. made from the short staple wool of the mt. sheep was a well-known production in Wales early in the sixteenth century. A material known as balze, which is a sort of coarse F., was introduced into England

by the Fr. refugees about 1578. In Rochdale, which is the historic seat of the industry, the manufacturers favoured a wool of fine texture from the Southdown sheep, and also the wool from a Norfolk breed. In Ireland the wool from the Wicklow variety of the Cottagh breed is used. F. is now made largely from Australian, New Zealand, and S. Amer. wools. The manuf. of F. in Rochdale alone employs over 2000 people, and a considerable export trade (5,500,000 yds. in 1927), is carried on by Great Britain. The increase of flannelettes on the markets has undoubtedly checked the progress of the F. trade, but the Merchandise Marks Act has done much to ensure for purchasers the genuineness of the article.

Flash Point, temp. at which an oil will give off a vapour which can be ignited. This temp. varies with the pressure on the surface of the oil, and is higher when the oil is heated in an open apparatus than when a closed one is used. To obtain an exact ratio a standard apparatus must be used. In England the one used is Abel's closed oil tester. It consists of a closed receptacle surrounded by a water jacket. The temp. is taken by means of a thermometer in the water. The oil receptacle is fitted with a sliding lid. From time to time this is slipped back and a light applied to the opening. The lowest temp. at which a flame appears is taken as the F. P. of the particular oil that is being tested. In most countries there are special regulations with regard to the storage of oils with low F. Ps. In England the minimum legal F. P. (determined in a closed apparatus) is 73° F.

Flat (C.E. *flat*, floor), applied in modern language to the story or floor of a building, fitted up as a self-contained residence, sev. of such dwellings being approached by a common staircase. The term flattened house is still used in Scots law. This tenement system is more common in Scotland and on the Continent than in England, but of late years it has been widely adopted in large tns. of this country, not only in congested dists., but in London suburbs.

Flat (b), character in musical notation which indicates that a note is to be sung or played a semitone lower than its natural pitch. The F. signature always occurs before the note to be flattened, in the case of an accidental, for example, where the F. comes in temporarily in the course of a piece of music, and the effect does not extend farther than the bar in which the F. is put. A double F. (bb) is a sign placed before a natural note, to show that the pitch is to be lowered by two semitones.

Flatbush, formerly a township of Long Is., near Prospect Park, Brooklyn. It has a lunatic asylum, and is now part of the bor. of Brooklyn.

Flat-coated Retriever, see RETRIEVER.

Flateyjarbók, or the Book of Flatey, collection of Icelandic legends and true stories, which was compiled in the fourteenth century, and which deals chiefly with the tenth and eleventh centuries A.D. One story tells how certain Norsemen

actually reached America some four centuries before Columbus. The MS. is now preserved in Copenhagen.

Flat-fish. The family Pleuronectidae, to which all F. belong, is distinguished by the unsymmetrical conformation of the head and anterior region of the body, in consequence of which both eyes are situated on the same side, in some cases the right and in others the left. The family Pleuronectidae embraces the dextral F. (halibut, etc.), with eyes on the right side; Bothidae, the sinistral F. (turbot, etc.); Soleidae (the soles), eyes right; Cynoglossidae (tongue soles, tropical species), eyes left. The body is greatly compressed and flattened, the side on which the eyes are situated being, as a rule, dark, and the under or eyeless side being colourless. Young F., which are met with in the open sea, are transparent and perfectly symmetrical, having one eye on each side of the head, and it is evident from individual metamorphosis that the order was originally normal in shape, though there is some difference of opinion as to the process of their evolution. The F. is exclusively carnivorous, and inhabits all seas except those of polar regions or off rocky coasts. Many species, such as flounders, ascend rivs., and some have become inured to a fresh-water existence. The pigment-bearing elements in the coloration of the dark side of the skin are known as chromatophores. When lying on the sandy bottom of the sea, which it chooses in preference to a muddy bed, the F. is hardly to be distinguished from its surroundings, as the bright spots on the skin harmonise exactly with the sand and pebbles. The least specialised or most primitive species is *Psettolodes erumei*, which ranges from the Red Sea through the Indian Ocean to China, and is also found on the W. coast of Africa; it has the dorsal fin commencing at the nape of the neck, whereas in all others it commences above or in front of the eyes. *Hippoglossus hippoglossus*, the halibut, has both eyes on the right side. The genus typified by *Rhombus maximus* (or *Psetta maxima*), the turbot, contains also *Rh. levis* (or *Bothus rhombus*), the brill. *Pleuronectes platessa*, the plaice, and *P. flesus* (or *Flesus flesus*), the flounder, are characterised by the narrow mouth aperture. Another group includes *Solea vulgaris*, the common sole; *S. auranziaca* (or *S. lascaris*), the lemon sole; *S. variegata*, the banded sole; *S. minula*, the dwarf sole, and other allied species.

Flat-foot. acquired deformity of the foot, in which both arches of the foot are impaired, more especially the lateral arch. It is caused generally by long periods of standing, and is therefore commonly seen in policemen, domestic servants, hospital nurses, etc. The tendency to F. is increased by any constitutional weakness, by lack of proper food, and by general debility. It is especially liable to occur after Pott's fracture of the ankle. In its earlier stages the condition is accompanied by pain along the upper and outer part of the foot.

Treatment.—It is important that the

condition should be treated early. Excellent results may then be obtained by rest, massage, and suitable exercises. The most useful exercises are standing and walking on tiptoe, rising on tiptoe and falling back on the heels; balancing on the outer edge of the feet; and walking on the outer edge of the feet. Many patent supports are made for this condition, and are very generally used. They are not to be recommended, as they tend to stretch further the tendons and ligaments of the sole of the foot which are already lax, and so, too, increase the F. High heels should be especially avoided. In the later stages of F., attempts have been made to improve the condition by setting the foot in the correct position in plaster of Paris splints. Some surgeons operate for the condition, removing a wedge of bone from the inner side of the foot. If, however, the condition has been allowed to go far, it becomes extremely intractable, and the results of operation are often disappointing.

Flatford, beauty spot in the par. of E. Bergholt, on the R. Stour, Suffolk, England. Flatford Mill, the property of the National Trust, and Dedham Mill figure in famous paintings by Constable.

Flatheads, name given to a tribe of N. Amer. Salish Indians, who formerly occupied the country round the mts. of N.W. Montana, between the Cascade range and the Rocky Mts. The name F. owes its origin to an anct. custom, once prevalent among Peruvian tribes, of flattening the skulls of children during infancy. The term is incorrectly applied to the Salishes, but the practice still continues among modern Chinooks and among other Indian tribes dwelling by the Pacific coast of N. America. The F. used formerly to offer human sacrifices to the sun. In 1841 Father P. J. de Smet founded among them a very successful mission, and they have developed into able and industrious farmers. They are brave fighters, but prefer peace, and have always maintained friendly relations with white races. They now dwell in reservations in Brit. Columbia and Washington, and their number is estimated at about 17,500.

Flatman, Thomas (1637–88), poet and miniature painter, was educated at Winchester and New College, Oxford, being a fellow of the latter in 1676. He painted excellent miniatures and wrote much poetry. Granger says: 'One of his heads is worth a realm of his Pindarics.' Saintsbury, on the other hand, says his 'unlucky name by no means expresses his poetic quality.'

Flat-racing, see under HORSE-RACING.

Flattery, Cape, headland of Washington state, U.S.A., washed on the N.E. by the strait of Juan de Fuca, and on the S.W. by the Pacific.

Flatulence, condition characterised by the presence of gas (*flatus*) in the stomach or intestines. It is usually accompanied by a feeling of oppression, and the accumulation can often be felt as an elastic swelling which has in some cases given rise to suspicion of a tumour. The

commonest cause of F. is digestive trouble. In normal digestion the food-material is broken up by the enzymes elaborated by the body itself, and the liquid products find their way into various channels for the nutriment of the body. Digestion may be accompanied by bacterial action which, to a certain extent, aids the activity of the digestive ferments. Bacterial fermentation is, however, accompanied by evolution of gaseous products, which exert pressure upon the walls of the alimentary tract and give rise to the symptoms of F. The condition may also be caused by chemical action between food material occasioning effervescence, or, as is often the case with infants, an accumulation of air ingurgitated with the food. In hysterical patients F. is often caused by evolution of carbon dioxide from the blood. The treatment depends mainly upon the cause. Infants suffering from wind are usually eased by the administration of dill-water, prepared from the aromatic fruit of *Peucedanum graveolens*, or fluid magnesia. The great absorptive properties of charcoal are utilised in preparations known as charcoal biscuits. Massage of the abdominal regions is often helpful. Among carminatives may be mentioned cloves, chillies, or cayenne pepper, ginger, peppermint, aniseed, etc. Where the F. is intestinal and obstinate an enema of asafoetida usually has a good effect.

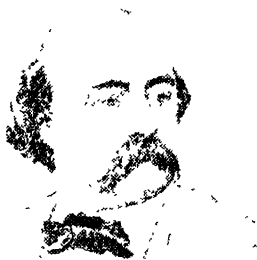
Flat Worms, see PLATYHELMINTHES.

Flaubert, Gustave (1821-80), Fr. novelist, b. at Rouen. He was the son of a surgeon, and did not leave his native place till 1840, when he went up to Paris to study law. His mother having been left alone through the death of his father and sister, he abandoned the idea of a legal profession, and made a home for her at Croisset, on the Seine, not far from Rouen, where he lived till his death. At this time he became an intimate friend of M. Maxime du Camp, with whom he travelled in Brittany in 1847, and Greece and Asia Minor from 1849 to 1851. From 1846 to 1854 he had an *affaire de cœur* with Mlle Louise Colet, apparently the only one of his life. He never married.

He began to write about 1846, and started with poetry, which he soon abandoned for prose. On his return from Greece he set to work on his great novel, *Madame Bovary*, which took many years to prepare, and finally appeared in serial form in the *Revue de Paris* (1857). It is the story of a girl of culture and high aspirations, married to a well-meaning but stupid doctor. Her various lapses into vice and her ultimate suicide are related with startling vividness. The pub. caused a great deal of scandal, and the author and publisher were prosecuted on a charge of violating morals, but were acquitted. In the following year F. paid a visit to Carthage and began a serious archaeological and historical study of its surroundings, which he made use of in his second work, *Salammô*, which was finished in 1862, a romance of the struggle between Rome and Carthage.

In 1866 he was decorated with the

Legion of Honour. Three years later he pub. a realistic novel of contemporary manners of the type of *Madame Bovary*, called *L'Éducation sentimentale*. It was followed in 1874 by *La Tentation de Saint Antoine*, a fantastic romance, worked up from fragments which he had written as early as 1857. He was now a distinguished member of a small literary set, which included Turgenev, Zola, Daudet, and the Goncourts. He was moreover, a personal friend of George Sand, his correspondence with whom was pub. posthumously. By temperament he was shy and morose, and wrote with great intensity, labouring over every word and never satisfied with what he had written.



GUSTAVE FLAUBERT

In 1877 he pub. *Trois Contes*, including *Un Cœur simple*, *La Légende de Saint Julien l'Hospitalier*, and *Hérodias*. His last work, *Bouvard et Pécuchet*, was unfinished, and was pub. posthumously in 1881. He d. of apoplexy, and was buried in the family vault at Rouen.

F.'s style is a model of purity and strength. His work is tinged with satiric melancholy. He loathed everything mediocre, and his hatred for the *bourgeois* amounted almost to monomania. He wrote with an extraordinary knowledge and insight of the manner of his time, and as a literary artist must be placed between the realistic and romantic schools, belonging to neither and yet having much in common with both. His undoubted preference was for romanticism, and it was rather in spite of himself that he achieved so great a triumph with his realistic novel, *Madame Bovary*, and so much so, that he is regarded as the true inspiration of all modern realist fiction.

His *Œuvres complètes* were pub. in 8 vols. in 1885. Of his works not already mentioned should be noticed two plays, *Le Candidat* (1874), and *Le Château des oiseaux* (1877); and *Par les champs et par les grèves* (1885). See Maxime du Camp, *Souvenirs littéraires*, 1889-93; E. Zola, *Les Romanciers naturalistes*, 1881; lives by E. Faguet (*Grands Écrivains français*), 1899; L. Bertrand, 1912; and A. Thiaudet, 1935; also R. Dumesnil, *Gustave*

Flaubert, l'homme et l'œuvre (with bibliography), 1932; H. Guillemin, *Flaubert devant la vie et devant Dieu*, 1939; and F. Steegmüller, *Flaubert and Madame Bovary*, 1947.

Flavigny-sur-Ozerain, com. of the dept. of Côte d'Or, France, noted for its culture of aniseed. Pop. 700.

Flavius, Julius, see CONSTANTIUS II.

Flavius Porphyrogenitus, see CONSTANTINE VII.

Flavius Valerius, see CONSTANTIUS I.

Flavones, Flavonols, colouring matters of plants. They may be divided into the following prin. classes: photosynthetic pigments—chlorophyll (q.v.); carotenoids—carotene; anthocyanins, and anthoxanthins. Most of these pigments occur as glycosides, with glucose or rhamnose; while a few occur free.

Flawil, small tn., 8½ m. W. of St. Gall, with which it is connected by rail, between the lakes Constance and Zürich in the N.E. of Switzerland. Pop. 5500.

Flax (*Linum usitatissimum*), dicotyledonous plant of the order Linaceæ. It is an ann., growing from 20 to 40 in. in height, bearing a corymb of bright blue flowers. The seed of the plant (commonly known as linseed) is of great value commercially and medicinally. The stem is also of great value in yielding a fibre which is used to make linen. The soil best adapted to the growth of F. is a deep rich loam in which there is much humus or vegetable mould. It thrives well in the rich alluvial land of Zealand and the polders. It is also raised with great success in the light sands of Flanders, but much more careful tillage and manuring are required. The land on which F. is sown must be very free from weeds, the weeding of this crop being a very important part of the expense of cultivation.

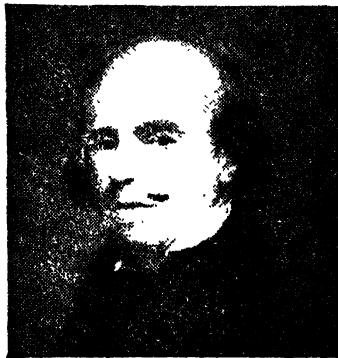
F. was used in the very earliest periods of civilisation. It is mentioned in the book of Exodus, and the lake-dwellers of the Stone Period are known to have used it to make ropes, lines, and fishing-nets. In anct. Egypt the cultivation and preparation of F. were very successful, and down to the fourteenth century Egyptian F. was famous throughout the civilised world.

The preparation of F. is done in six stages, which are (1) *Pulling*.—This should be done in dry weather, and the plant should be pulled up by the roots. (2) *Rippling*.—That is separating the seeds from the stalks. (3) *Retting or rotting*.—This is done either by soaking in soft water (*water-retting*), or by exposing to the dew (*dew-retting*). Schneek's method is now generally used. In this the fibres are soaked for a shorter time in warm water. (4) *Drying*.—Often called grassing, as the fibre is spread out on short grass to dry. (5) *Breaking*.—Preparatory to scutching. (6) *Scutching*.—The separation of the fibres from the woody part of the stalk. This can be done by hand, though of late scutching machines have been chiefly used.

The F. industry of Great Britain has been steadily decreasing since the middle of the last century. Ireland is the only

part now in which any considerable crop is grown. Russia now grows the largest crop of any European country. The F. industry of the U.S.A. is also very considerable.

Flax, New Zealand (*Phormium tenax*), also called Flax-lily, Flaxbush, monocotyledonous plant belonging to the Liliaceæ order. It grows wild in New Zealand, but is half hardy in this country, where it is generally grown in cool greenhouses. Its leaves are from 2 to 6 ft. long, and 2 or 3 in. broad. Their fibres are very strong and fine, and in New Zealand are used to make clothes, dresses, mats, etc. In England the N. Z. F. is used chiefly for ropes and sailcloth. It is obtained by cutting the leaves from a plant, and macerating them, after which the fibres are easily extracted. The New Zealanders obtained more perfect F. by a laborious process of manual separation without maceration. Intensive research work is (1931) being carried out in New Zealand at Massey College on the breeding and selection of improved strains of *Phormium* with a view to raising the general standards of strength and productivity, and encouraging results have already been obtained by the college.



JOHN FLAXMAN

Engraving after the painting by John Jackson.

Flaxman, John (1755–1826), Eng. sculptor, b. at York. He was the son of John F., a moulder of plaster figures and casts in Covent Garden, London. He was a sickly, slightly deformed boy, and spent his childhood mostly indoors, drawing and playing with moulds. He exhibited models at the Free Society of Artists in 1767 and 1769, and won the silver medal of the Royal Academy in 1770. During 1775–87 he earned a livelihood by his beautiful designs for the china ware of Messrs. Wedgwood. In 1787 he married and settled in a studio in Wardour Street, where he executed monumental sculpture for the dead. His work of this class includes monuments of Chatterton in St. Mary Redcliffe, Bristol; of Collins,

and of the Rev. T. and Mrs. Ball in Chichester Cathedral; and of Mrs. Morley in Gloucester Cathedral. For seven years (1787-94) he lived in Italy, studying and perfecting his art, and while there, executed his famous designs for Homer (pub. 1793), Æschylus (1795), and Dante's *Divina Commedia* (1797), as well as a marble group of 'The Fury of Athamas,' and a 'Cephalus and Aurora,' from the stories in Ovid's *Metamorphoses*.

He was elected R.A. in 1800; appointed prof. of sculpture to the Royal Academy in 1810. His work is pure and simple in style, and is executed in the true classic spirit, but occasionally shows weakness in portraying the stronger emotions. The most notable of his later works are monuments of Nelson, Howe, and Sir Joshua Reynolds in St. Paul's, Lord Mansfield and Capt. Montague in Westminster Abbey, and 'St. Michael' at Petworth. The F. gallery in Univ. College, London, was founded by his wife's sister. His *Lectures* were ed., with a 'Brief Memoir' in 1829. See A. Cunningham, *Lives of the Most Eminent British Painters, Sculptors, and Architects* (vol. iii.), 1830; S. Colvin, *The Drawings of Flaxman*, 1876; and W. G. Constable, *Flaxman*, 1927.

Fleabane, popular name for plants of the genera *Conyza* and *Erigeron*, both of the order Compositæ; from the former a volatile oil is prepared, which keeps away insects, and the scent of the *Erigeron acris* serves the same purpose.

Fleas are parasites of the *Pulex* genus. There are about 500 varieties known, many of which are specific to some particular bird or mammal. The word is commonly used to refer to the variety that chiefly infests man, the *Pulex irritans*.

The flea is a wingless insect, with a laterally compressed body strongly cased in chitin to withstand pressure, small head, and six long powerful legs. It lives on the blood of warm-blooded animals, though it can evidently live for long periods without such food. The piercing organ is the mandible, and not the maxilla, while the upper lip forms the sucking tube. The flea is justly famous for its jumping powers, which are equal to those of the locust, that is, it can jump 200 times its own length.

The eggs are not very numerous as a rule. They hatch in from six to twelve days, when wormlike bristly larvæ emerge. These live for about a fortnight feeding on decaying organic matter before forming cocoons. Thus *Pulex irritans* takes about a month to reach maturity. The Indian rat-flea, *Xenopsylla cheopis*, transmits the plague.

The chigoe or jigger of S. America and W. Africa is another famous member of the family. See CHIGOE.

Flèche, term in Fr. architecture used generally for a spire and especially for a slender spire of timber covered with lead, rising from the intersection of the nave and transepts of large churches.

Flèche, La, tn. of France in the dept. of La Sarthe, manufacturing paper, oil, and leather. It has also a timber trade.

Since 1764 it has been the seat of a famous military school for the sons of officers. Here also are the heart and a statue of Henry IV. Pop. 11,200.

Flecker, James Elroy (1884-1915), Eng. poet and playwright; b. Lewisham, London; elder son of Rev. Wm. Herman F., headmaster of Dean Close School, Canterbury, where he was educated before going to Trinity College, Oxford. James was his substitution for Herman, his baptismal first name. Prepared for consular service by two years at Cambridge, where he studied oriental tongues. He served in Constantinople in 1910 and 1911, and transferred to Beirut, where he was vice-consul till 1913. He d. of consumption at Davos Platz. Works, including poems: *The Bridge of Fire* (1907); *Forty-two Poems* (1911); *The Golden Journey to Samarkand* (1913); *The Old Ships*, a collection of seventeen poems pub. posthumously (1915); a novel, *The King of Alexander* (1914); two plays—*Hassan* and *Don Juan*—both pub. posthumously. F. follows the objective methods of the modern Fr. poets of the Parnassian school—eschewing the personal and emotional. Except in *Hassan* he rarely got beyond the stage of experimentation in verse. *Hassan* is notable more for its lyrics than for any dramatic qualities. It was produced at the Haymarket in 1923. See J. C. Squire's introduction to *The Collected Poems of James Elroy Flecker*, 1916.

Flecknoe, Richard (c. 1620-78?), Irish Rom. Catholic priest and playwright, who travelled between 1640 and 1650 in Europe, Asia, Africa, and Brazil. He afterwards settled in London, where he wrote sev. now forgotten plays. His name is remembered in connection with the poet Dryden, who gave his merciless satire against Shadwell the title of *Mac-Flecknoe, or a Satyr upon the True-Blew Protestant Poet, T. S.* Marvell also wrote a satire on him.

Fleet (O.E. *fleotan*, to float; cf. Ger. *fließen*), word denoting a collection of ships, and particularly a collection of warships belonging to the navy of one nation, and under the supreme command of a single officer. In Great Britain it should consist of at least ten ships, to each of which are attached torpedo-boats, cruisers, etc. Little difference is made between a F. and a squadron, the words being used indiscriminately of a div. of the R.N. The word is also applied to a number of vessels for fishing or other commercial purposes.

Fleet Air Arm consists of those aircraft, and the men who fly and tend them, that are embarked in H.M. ships; it is a part of the R.N., and not of the R.A.F. In the Second World War it did not fly from H.M. ships alone, if the needs of the moment required otherwise. Naval squadrons at home operated as units of one or other command of the R.A.F.—coastal (q.v.) or fighter (q.v.)—for operations in the Channel or in other seas. In the battle of Britain (q.v.) more than forty naval pilots, few of whom survived, joined the fighter command and fought alongside their brethren of the R.A.F.

Among the many operations in which the F. A. A. greatly distinguished themselves were those at Taranto, when many It. warships were sunk or damaged (see WORLD WAR, SECOND, *Naval Operations*), the battle of Matapan (q.v.), the sinking of the *Bismarck* (see 'BISMARCK, THE'), and the Malta convoys. Some six old Swordfish planes of the F. A. A. made a most heroic if abortive attempt to stop the escaping Ger. warships *Scharnhorst*, *Gneisenau*, and *Prinz Eugen* in the Eng. Channel on Feb. 12, 1942. Lt.-Cdr. Esmonde, who led these aircraft on that occasion, receiving a posthumous V.O. Aircraft carriers are the moving airfields of the F. A. A. See *The Fleet Air Arm* (pub. by the Admiralty H.M.S.O.), 1943, and J. Moore, *The Fleet Air Arm*, 1943; and *Escort Carrier*, 1944.

Fleet Prison, famous London jail, which was situated on the E. side of Farringdon Street, on what was formerly known as Fleet Market. It took its name from the Fleet stream, and is supposed to have dated from Norman times. During the reigns of Mary and Elizabeth it was the scene of imprisonment of Catholic and Protestant martyrs, and later of those who were condemned under the Star Chamber and court of chancery. In 1640 the Star Chamber was abolished, when F. P. came to be used as the prison for debtors and bankrupts. The prison had many times to be rebuilt. It was destroyed in the reign of Richard II. by the followers of Wat Tyler; in 1666 it was burnt down during the Great Fire of London; and in 1780 it was destroyed during the Gordon riots, but again rebuilt in 1781-82. Among its celebrated prisoners were Bishop Hooper, Prynne, Wycherley, and Penn, the colonist of Pennsylvania. Its keeper was called the warden of the Fleet. During the seventeenth, eighteenth, and part of the nineteenth centuries it was notorious for the clandestine marriages contracted within its walls, the first notice of which is in 1613. They were at first celebrated in the Fleet Chapel, but on marriages without banns being prohibited in chapels, the precincts of the Fleet were employed for the performance of these marriages. Such unlicensed marriages were declared to be void by Act of Parliament in 1753, which came into force in March of the following year. See J. Ashton, *The Fleet, its River, Prison, and Marriages*, 1888.

Fleet Street, newspaper centre of London, England, running from the end of the Strand at Temple Bar to Ludgate Circus. It takes its name from the R. Fleet, and (together with the nearby Bouverie Street and Tudor Street) has the offices and printing establs. of many of the leading Brit. newspapers and news agencies, and London offices of foreign newspapers.

Fleetwood, Charles (d. 1692). Eng. commonwealth soldier; third son of Sir Miles F., of Aldwinkle, Northamptonshire. His eldest brother was a royalist; the second went to Sweden; and Charles, studying law in Gray's Inn when civil war began, joined the parl. army as

trooper. He was colonel of horse at Naseby; M.P. for Marlborough, 1646; governor of Isle of Wight, 1649, and fought with Cromwell at Dunbar, 1650. He became a member of the council of state, and lieutenant-general in 1651. He led cavalry at Worcester. F. married (second of three wives) Bridget, daughter of Cromwell and widow of Ireton, 1652. In Ireland as commander-in-chief till 1655—for last year lord-deputy. He was one of the major-generals of 1655; and one of 'Oliver's lords.' Always for the army as against Parliament, he was popular with religious extremists. On Oliver's death commander-in-chief of army, 1659, till deprived by the Rump Parliament. Included in indemnity at Restoration. F. was buried in Bunhill Fields.

Fleetwood, bor. and port at the mouth of the R. Wyre, Lancashire, England, 9 m. N.E. of Blackpool. It has steamship services to Belfast, the Isle of Man, and Scotland. The chief industry is steam-trawler fishing. Pop. 24,000.

Flegel, Eduard Robert (1855-86), Ger. traveller in W. Africa, b. of Ger. parentage at Vilna in Russia. After a commercial education he devoted his life to acquiring for Germany the major share of the trade of the Niger. He ascended this riv. first in 1879 in the London Missionary Society's steamer, and a year later in his second ascent reached Sokoto. In 1883 he discovered the sources of the Benue to the S. of Adamawa. He wrote *Loose Blätter aus dem Tagebuche meiner Hausa-freunde* (1885) and *Vom Niger-Benue* (ed. by K. Flegel, 1890).

Fleischer, Heinrich Leberecht (1801-88), Ger. orientalist, b. at Schandau, Saxony. He ed. Abulfeda's *Historia ante-Islamica* (1831-34) and Beldhawi's *Commentary on the Koran*, and trans. Ali's *Hundred Sayings* into Ger. (1837).

Fleming, Sir Alexander (b. 1882), Brit. bacteriologist, b. at Lochfield, Darvel, Scotland. Educated at Kilmarnock Academy and St. Mary's Hospital Medical School, London. M.B., B.S. (London), and the univ. gold medal, 1908; F.R.S., 1943; F.R.C.P., 1944. Prof. of bacteriology at St. Mary's Hospital till 1948. He is best known for his discovery (in 1928) of the anti-bacterial substance penicillin (q.v.), extracted by him from a green mould, *Penicillium*, which contaminated a culture of bacteria on which he was working. His early extracts proved unstable, and it was not until the Second World War that a stable product was prepared on a large scale, and was the means of saving countless lives. For this work F. was knighted in 1944, and received the Nobel prize in 1945. His earlier discovery of lysozyme (1922), an antiseptic present in tears and preserving the eyes from infection, was also important. He has pub. many papers on bacteriological subjects, and gained numerous distinctions besides those here detailed.

Fleming, David Hay (1849-1931), Scottish historian. He was educated at Madras College, St. Andrews. Retired from business, 1883, to devote himself to

Scottish hist. Puba.: *Martyrs and Confessors of St. Andrews* (1887); *Scotland after the Union of the Crowns* (1890); *Mary Queen of Scots* (1897); *Three Sections of Scottish History and Life* (1902); *The Story of the Scottish Covenants in Outline* (1904); *The Reformation in Scotland* (1910); and *Critical Reviews relating chiefly to Scotland* (1912).

Fleming, Sir John Ambrose (1849-1945), Eng. electrical engineer, b. at Lancaster. He entered St. John's College, Cambridge, in 1877, and after a brilliant career was appointed univ. demonstrator in applied mechanics; first prof. of mathematics and physics at Univ. College, Nottingham; electrical engineer to the Edison Electric Lighting Company (1881), in which capacity he superintended the introduction of incandescent electric lighting in England. In 1885 he became prof. of electrical engineering in Univ. College, London, and obtained the erection of its engineering and electrical laboratories. He made the first thermionic valve in 1904. Chief puba.: *Short Lectures to Electrical Artisans* (2nd ed.) (1885); *Magnets and Electric Currents* (1897); *Wireless Telegraphy* (1905); *Radio-telegraphy and Radio-telephony* (1908); *Propagation of Electric Currents in Telephone and Telegraph Conductors* (1911); *The Wonders of Wireless Telegraphy* (1913); *The Thermionic Valve in Radio-telegraphy* (1919); *Fifty Years of Electricity* (1921); *Electrons, Electric Waves, and Wireless Telephony* (1923); and *The Interaction of Scientific Research and Electrical Engineering* (1927). He was knighted in 1929.

Fleming, Sir Sandford (1827-1915), Canadian engineer, b. at Kirkcaldy, Scotland. He became chief engineer for the dominion gov. (1867-80), when he superintended the construction of the intercolonial railway. Author of *The Intercolonial: a History* (1876); *England and Canada* (1884); and *The New Time Reckoning* (1889). See L. J. Burpee, *Sandford Fleming, Empire Builder*, 1915.

Flemings, see FLANDERS.

Flemings in England. Flemish settlers probably first came to England in the reign of Henry I., who expelled the Welsh from Lower and S. Dyfed (Pembrokeshire) in favour of Teutonic settlers. These colonists soon became anglicised, but, up to the present day, have retained many of their Teutonic characteristics and have shown little inclination to intermarry with the Celts. During the reign of Stephen, Flemish weavers estab. themselves in the E. cos. and made Norwich famous as the centre of the cloth industry. The close commercial relations between England and Flanders, estab. by the *Magnum Intercursus*, 1496, encouraged emigration. During the Reformation many Flemish Protestants sought refuge in this country.

Flemish Art. The chief names in the Flemish school of painting, prior to the time of Mabuse, are the van Eyck brothers and sister of whom Hubert (c. 1370-1426) and John (c. 1390-1440) are supposed to have invented painting in

oils. John van Eyck is notable for brilliant and rich colouring. A polyptych by the brothers was stolen by Gers. from the cathedral of St. Bavon in Ghent (see also EYCK). Dirk or Dierick Bouts (q.v.) (d. 1475), a Dutch landscape or historical painter, who settled in Louvain and whose work has affinities with that of Rogier van der Weyden or de la Pasture (q.v.) (1400-64). The architectural background and floating angels of Mabuse's celebrated 'The Adoration of the Kings' owe something to the influence of van der Weyden. Hans Memling (or Memlinc) (q.v.) (c. 1430-94), a native of the Rhineland who settled in Bruges, is famous for his panels of religious subjects. Rogier van der Weyden, too, exerted an important influence on Memling. Memling's art is essentially classical, in so far as for him what was accidental or abnormal did not exist, his concern being only with the general or universal; he is also notable on account of his regard for unity, composition, and finish. He was equally celebrated as a portrait painter. Most of his portraits are inspired by a religious emotion; thus he portrayed the donors of his altar-pieces praying under the protection of their patron saints. It is generally believed that Memling painted in oils. In the old chapter-house of the Hôpital Saint-Jean, Bruges, before the Second World War, were to be found sev. of his masterpieces: 'The Mystic Marriage,' 'The Adoration of the Wise Men,' 'The Shrine of Saint Ursula,' 'The Descent from the Cross,' and others. Of this period, too, are Gerard David (q.v.) (c. 1450-52) of the Bruges school, who was famous for altar-pieces, and Quentin Matsys (q.v.) (1466-1530), who also painted religious subjects. Jan Gossaert, called Jan of Mabuse (q.v.) (b. c. 1470 at Mauberge and d. at Antwerp 1541 or, according to some, in 1532), changed the whole spirit of antecedent F. A. by Italianising it under the influence of the work of Leonardo and Michelangelo. Critics still ask themselves whether Mabuse did any service to his own creative art or to his own country generally by visiting Italy; for the Flemish native soul has nothing in sympathy with the cold and polished works of the school of Leonardo. Mabuse is at his best in mingling the study of architecture with the gaudy system of colouring peculiar to artists of stone. His magnificent altar-piece, 'The Adoration of the Kings,' in the National Gallery, London, is essentially Flemish in outlook and is one of the glories of European art. Of equal importance is the fact that the remarkably minute finish of every part of the picture faithfully reflects the conscientious methods that inform the subtle work of the famous Flemish illuminators of MSS. His later work—perhaps it may be called artistic degeneration—may be seen in the 'Adam and Eve' at Hampton Court, and in the 'Neptune and Amphitrite' (1516), formerly in Berlin, the figures of which lack the sublimity and dignity of those of his pre-It. period. One fruit of his It. contact was that he chose to sign himself 'Mabodius.' Contemporary with

Mabuse was Joachim da Patinir (c. 1490-1524), the artist who first painted landscape for its own sake, i.e. not merely as a background or irrespective of its inherently exciting or dramatic qualities or of its subtle charm. His 'Repose in Egypt', at Brussels, is a good example of his method. Henri de Bles (q.v.) (1480-c. 1550) is believed to have been a pupil of Patinir. His *Virgins and Holy Families*, influenced by his long stay in Italy, show a further departure from the original spirit of F. A.. Other sixteenth-century painters were Bernard van Orley (q.v.) (c. 1493-1560), who was famous for tapestry designs; Michael Coxie (q.v.) (1494-1592), a pupil of van Orley, whose work shows the influence of Raphael; Lambert Lombard (q.v.) (or Susterman) (1506-60), who was also an engraver; Antonio Moro (q.v.) (or Sir Anthony More) (c. 1525-81), painter to Queen Mary of England; and Pieter Brueghel (c. 1520-69 or 1570), founder of the celebrated family of Flemish painters of that name. Flemish painting reached its golden age in the seventeenth century—the century of Rubens, van Dyck, and the Teniers. Peter Paul Rubens (q.v.) (1577-1640), the most eminent representative of F. A. and one of the greatest painters of any school, has been called the great model for chiaroscuro. He is correct in design and magnificent in his drapery. Though the beauty of his female types is generally most pleasing, it does not aim at it. refinement or airy grace, but then neither does his work generally reflect the stiffness of Italianate imitators; rather is it Flemish in warmth and life throughout, and indeed it was Rubens who, reacting from the school of Mabuse, brought F. A. back to its true spirit and to nature. Some critics have charged him with historical improprieties or anachronisms; but he is too good a classical scholar not to be fully aware of what he is doing, and in this he followed the example of Titian, Paul Veronese, and others. For nearly a century the Flemish school of art may be said to have been but a reflection of the principles of Rubens, and neither in name nor in fact did that school ever find a second Rubens; and his paintings (at least before the Second World War) were to be found in all the prin. galleries of Europe. Sir Anthony van Dyck (q.v.) (1599-1641) early in life worked with Rubens. At the outset of his career his power of conception was greatly superior to his refined taste as a portrait painter. One of the most brilliant figures in the hist. of art, he yet cannot be said to have formed a school. It was hardly possible for him to reach an equal degree of expression when choosing the same subjects as Rubens; but in applying the same principles of bold and comprehensive imagination to portrait painting he was no less successful; nor indeed are Titian, Raphael, Rembrandt, or Velasquez superior to him in this branch. The harmony of figure with background seems to have been with him a guiding principle, whether in light and shade or colour, while his physiognomical interpretation

gives an enduring character to all his portraits because it is so closely related to picturesque necessity. Sometimes he may be thought to be deficient in solidity or to be rather prone to unnecessary fluidity in attitude, but these defects, if defects they be, are outweighed by his sense of proportion, elegance of outline, and altogether admirable technique. David Teniers the Elder (q.v.) (1582-1649) and David Teniers the Younger (q.v.) (1610-94), though Flemish by birth and education, belong more closely to the Dutch school. The younger Teniers was a pupil of Rubens. In style he followed



W. F. Mansell
VAN DYCK'S 'PORTRAIT OF A LADY'

his father, but with a much superior power of conception. He shows also the influence of Adrian Brauer (q.v.) (1608-1640) early in his career. Truth in physiognomy and beautiful effect of light and shade, frankness in expression, and freedom of attitude characterise his famous 'Jubilee Meeting of the Civic Guards,' which went to St. Petersburg. Few artists worked with greater ease, and hundreds of his pictures are or were to be found in European museums or in private collections. While many of his interiors are masterpieces, they do not often equal his open-air scenes, which are alive with carefree joyousness and everlasting sunshine. Some of his tavern scenes are characteristic of this genre, though Brauer was better acquainted with this milieu than was Teniers; while his cottage interiors are less realistic than those of Ostade and, as an etcher, Teniers compares unfavourably with both Ostade and Cornelius. Other seventeenth-century

painters are Frans Snyders (*q.v.*) (1579-1657), painter of animals and of battle-pieces; Casper de Crayer (*q.v.*) (1582-1669), whose chief works are altar-pieces; Jakob Jordaens (*q.v.*) (1593-1678) who, after Rubens's death was the acknowledged leader of the Antwerp school; Gonzales Coques (or Cox) (*q.v.*) (1618-84), a pupil of Pieter Brueghel, who excelled in cabinet portraiture taking van Dyck as his model; Pieter van der Pae (or Sir Peter Lely) (*q.v.*) (1671-80), whose *chef-d'œuvre*, a series of portraits of women of the court of Charles II. of England, is at Hampton Court; Lucas van Uden (1595-1672) and Jan Fyt (1609-61). A large number of Flemish painters, many of them pupils of Rubens, lived in the seventeenth century, but they are of no importance. Among eighteenth-century painters are Cornelis Huysmans (1648-1727) and Jan van Bloemen (1662-1740).

Evidently one cannot speak of a contemporary Belgian school of art, whether Flemish or Walloon, or of any tendency to grouping artists of to-day under the inspiration of a common ideal. This might have been possible twenty or more years ago in the epoch of Expressionism. Of Belgian expressionist painters Fritz van der Berhe has sunk into oblivion and the reputation of Gustave de Smet has not survived a temporary popularity. Permeke and Tytgat are still living (1949), but both now paint without caring whether they be expressionists or not. Tytgat, the most refined of to-day's Belgian painters, is difficult to classify, for his method is always changing in the effort to avoid 'stylisation'. No coherent movement has succeeded Expressionism. Wolvens, Dasnoy, Stobbaerts, and the sculptor Grand have nothing in common but their aversion from the efforts of their predecessors, whether cubists, expressionists, or surrealists. Wolvens is perhaps the most richly gifted of all modern Belgian painters, with his luxuriant colouring and heavily laid-on paint, but even his best pictures lack composition; they are magnificent slabs of painting without more. 'With the example before him of many Flemish painters,' says M. Arnold de Kerchove, 'Wolvens abandons himself to his instinct and is content to be only an eye. To say that is at once to praise him while indicating the limitations of his art.' The admirers of Paul Delvaux do not hesitate to acclaim him the foremost contemporary Belgian painter; but others say that this would only be true if he were judged by the yardstick of his excellent intentions, and that in the effort to realise his dreams or obsessions he employs an academic technique which is the very negation of painting. *The Last Flowering of the Middle Ages*, by J. van der Elst (1945), collates all the essential things that should be known in order to understand Flemish painting of the fifteenth century. See also H. Fierens-Gevaert, *Études sur l'art flamand: La Renaissance septentrionale*, 1903; R. Oldenburg, *Die Flämischen Malereien im sechzehnten Jahrhundert*, 1922; and L. van Puyvelde, *The Flemish Primitives*, 1948.

Flemish Bond, see BRICKWORK.

Flemish Language and Literature, see FLANDERS, *Flemish Language and Literature*; and BELGIUM, *Literature*.

Flensburg, tn., 19 m. N. of Schleswig in Schleswig-Holstein, at the end of Flensburg fjord, an inlet of the Baltic. There are iron and machine works, copper and zinc factories, shipbuilding yards, brick, cement, and lime works, and breweries. Fishing and fish-curing are also carried on. The tn. passed from Denmark to Prussia in 1864. F., in the closing days of the Second World War, was the headquarters of the stop-gap gov. of Adm. Doenitz (*q.v.*). Here and at Kiel and Copenhagen the Gers. had concentrated what remained of the Ger. Navy. The Doenitz Gov. seems to have contemplated yet another redoubt in Norway; but this shadow gov. had only a precarious hold on Radio F. and the adjacent area; and a few days after the foreign secretary, Count Schwerin von Krosigk, had broadcast a farweld message to the Ger. people, the Doenitz Gov. in F. was dissolved and arrested, and Doenitz was placed on the list of war criminals. Pop. 70,900.

Flers, manufacturing tn. in the dept. of Orne, France. A linen and cotton manufacturing dist. There are also drug, chemical, brick, tile, and dye works. Pop. 12,300.

Flesh (*A.-S. fleesc*), the softer tissues of the body, the muscles, adipose tissue, and generally those parts of an animal commonly used as food. The term is applied also to the body, and its capacity for receiving sense-impressions from phenomena in the world of matter as opposed to spirit, consequently F. stands for the basic parts of human nature. According to Ger. physiologists, F. is substance in the human body whose constitution approximates to that of muscle.

Flesh-fly, see HOUSE-FLY.

Fleishy School, name given by Robert Buchanan to the 'realist' school of poets, which includes, among others, D. G. Rossetti, Swinburne, and Wm. Morris.

Fleta, early Lat. treatise on the common law of England, with the sub-title *Seu Commentarius juris Anglicani*. It is supposed to have been written during the reign of Edward I., about the year 1290. The author is unknown, but wrote it during his confinement in the Fleet prison; hence the name. The work is divided into six books, the author having adopted the plan of Bracton, and in many instances transcribed whole pages from him. F. was originally pub. by J. Selden from an MS. in the Cottonian Library in 1647, a second ed. appearing in 1685. It is also printed in Honard's collection.

Fletcher, Andrew, of Saltoun (1655-1716), Scottish politician. He so vehemently opposed the measures of the duke of York (subsequently James II.) that he was obliged to flee to Holland. In 1685 he accompanied Monmouth on his expedition to the W. of England. He returned to Scotland at the revolution of 1688 and his estates were restored to him. On the passing of the Act of Union, F. retired from public life. See *The Political Works*

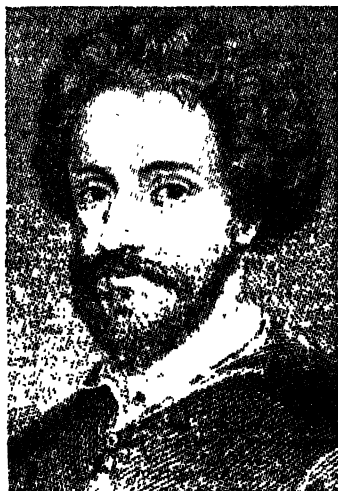
of Andrew Fletcher, 1737, and Earl of Buchan, *Essay on the Lives of Fletcher of Saltoun and the Poet Thomson*. 1792.

Fletcher, Sir Banister Flight (b. 1866), eldest son of Prof. Banister F. Educated at Univ. College, London, and Royal Academy. For some time lecturer and assistant prof. at King's College, London, and examiner to the City and Guilds of London Institute and, later, was univ. staff lecturer on architecture at London Univ., and sole partner in the firm of Banister F. & Sons. Has a keen sense of the value of old styles of architecture as an integral part of the evolution of modern styles, and emphasises the importance of a study of old buildings in architectural education and training. He has written, among other works, *The Influence of Material on Architecture* (1897); *The Architecture of the Twentieth Century from the Point of View of Public Health* (1901); *Andrea Palladio, his Life and Work* (1902); *The English Home* (1911); and *A History of Architecture on the Comparative Method* (1921). See W. Hanneford-Smith, *The Architectural Work of Sir Banister Fletcher*, 1935.

Fletcher, Giles (c. 1588–1623), Eng. poet, son of Dr. Giles F., a poet, and cousin of John F. the dramatist. He was b. in London, and educated at Westminster School and Trinity College, Cambridge, where he became reader in Gk. grammar (1615) and in Gk. language (1618). He took holy orders and received the rectory of Alderton, Suffolk. His chief work is *Christ's Victorie and Triumph, in Heaven, in Earth, over and after Death* (1610), a poem in the epic style, divided into four cantos. It is written in eight-line stanzas, the first five rhyming a, b, a, b, b, the stanza ending with a rhyming triplet, the last line being an Alexandrine. The poem owes much to Spenser and in turn influenced Milton. Eds. of his collected works are those of A. B. Grosart in the Fuller Worthies Library (1868) and in the early Eng. Poets (1876), and of F. and Phineas F. by F. S. Boas (1908–9). Giles F. also contributed to *Sorrow's Joy* on the death of Elizabeth, and wrote *The Reward of the Faithful* (1623). See *Fuller's Worthies of England* (vol. II.), ed. 1811, and H. E. Cory, *Spenser, the School of the Fletchers, and Milton*, 1912.

Fletcher, John (1679–1625), dramatist, was a son of Dr. Richard F., bishop of London. B. in Dec. at the picturesque vill. of Rye in Sussex, of which par. his father was then the officiating priest, tradition has it that at the age of twelve he was sent to Bene't (Corpus) College, Cambridge, where he remained until the summer of 1596. The bishop dying then and leaving behind him little property beyond a library, it behoved the young man forthwith to begin to earn his own livelihood. Like many another thrown penniless upon the world without any special qualifications, he looked to his pen for support, and, as all the world now knows, with more of success than even he can then have anticipated. It is said that he at once began to write for Henslowe, a theatrical manager and perhaps became

the stock-dramatist for that personage. Of these early writings and adaptations of the plays of others nothing is known. His hist. only becomes definite after he made the acquaintance of Francis Beaumont (1584–1616) in, or perhaps somewhat earlier than, 1607. The two men became great friends, lived together near the Globe Theatre, and wrote plays in collaboration. The first fruits of their literary partnership was *The Woman Hater* (1607). This was the first of their twenty plays, the best of which perhaps are *Phylaster* (1620); *The Maides Tragedy* (1619); *A King and No King* (1619); *The Knight of Malta* (1618); *The Knight of the*



JOHN FLETCHER

Burning Pestle (1613); and *The Double Marriage* (c. 1620). Beaumont wrote only one masque by himself; F. no fewer than twenty-four plays without assistance, and sev., after Beaumont's death, with other collaborators. The literary partnership of Beaumont and F. has attracted much attention, scholars being curious as to the share of each in the plays written jointly. The fact that Beaumont's name comes first is not supposed to indicate that he was the predominant partner, but that when they came together he had already a reputation as an author. It is generally conceded that Beaumont wrote better and had more of the true poetic fervour in him, and that F. had the sprittier wit and a more vivacious fancy. As against this, it may be put that in *The Faithfull Shepheardesse*, the most beautiful of pastoral plays in the language, F., who was entirely responsible for it, showed himself a very true poet. Unfortunately the plays are nearly all so gross that it is impossible to represent them to-day, and

this is the great pity because, apart from this defect, they contain so much that is splendid, such beautiful thought, and such admirable poetry. The first collected ed. of the plays of Beaumont and F. appeared in 1647, containing thirty-four plays never before printed. The Variorum ed. of 1904-12 were ed. by various editors under the general direction of A. H. Bullen. A. Glover and A. R. Waller ed. a reprint of the ed. of 1679, with collation of all the previously printed texts (1905-12), and G. P. Baker a selection of plays in Kerman's Library (1911). See J. Monck Mason, *Comments on the Plays of Beaumont and Fletcher*, 1798; O. L. Hatcher, *John Fletcher, a Study in Dramatic Method*, 1905; E. H. C. Oliphant, *The Plays of Beaumont and Fletcher*, 1927; J. H. Wilson, *The Influence of Beaumont and Fletcher on Restoration Drama*, 1928; and U. M. Ellis-Fermor, *The Jacobean Drama*, 1936.

Fletcher, John Gould (b. 1886), Amer. poet, b. at Little Rock, Arkansas, Jan. 3, son of John Gould F. Educated at Phillips Academy, Andover, Massachusetts, and Harvard. He has used his travelling experiences in his verse to good purpose. His sojourns in various parts of Europe and in the W. states of America, together with steamboat trips down the Mississippi, extended from 1903 to 1916, when he settled in London, England. His vols. of verse include *Fire and Wine* (1913); *The Dominant City* (1913); *Irradiations—Sand and Spray* (1915); *Goblins and Pagodas* (1916); *The Tree of Life* (1918); *Japanese Prints* (1918); *Breakers and Granite* (1921); *Parables* (1925); *Branches of Adam* (1926); *The Black Rock* (1928); *XXIV. Elegies* (1935); *The Epic of Arkansas* (1936); *Life is my Song* (1937); *Selected Poems* (1938); *South Star* (1941); *The Burning Mountain* (1946); and *Arkansas* (1947). Awarded Pulitzer prize in poetry, 1939. Trans.: *The Dance over Fire and Water* (by Elío Faure) (1926); *The Reveries of a Solitary* (Rousseau) (1927). His critical works are *Paul Gauguin, His Life and Art* (1921); *John Smith—also Pocahontas* (1928); and *The Two Frontiers* (1930).

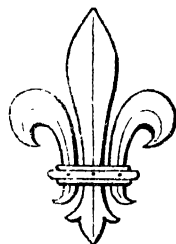
Fletcher, Phineas (c. 1582-1650). Eng. poet, elder son of Dr. Giles F. He was b. at Cranbrook, Kent, and educated at Eton and King's College, Cambridge. With his brother Giles he contributed to *Sorrowes Joy* (1603). His pastoral drama, *Sicelides, A Piscatory* (1614), was written for performance before James I. He took holy orders, and ultimately became rector of Hilgay, Norfolk, where he remained for the rest of his life. His prin. work is *The Purple Island: or the Isle of Man* (1633), written in twelve cantos of seven-line stanzas. It is an allegory of the human body, written in the manner of Spenser. There are many passages of great beauty, but much of the poem is marred by far-fetched conceits. F.'s other works include two prose treatises, *The Way to Blessedness and Joy in Tribulation* (both 1632), and a poem called *The Locusts, or Apollyonists* (1637), attacking the Jesuits. His complete poetical works were ed. by A. B. Grosart in the Fuller Worthies

Library (1869), and those of F. and his brother Giles by F. S. Boas (1908-9). See H. E. Cory, *Spenser, the School of the Fletchers, and Milton*, 1912, and A. B. Langdale, *Phineas Fletcher*, 1937.

Fletton, par. of Huntingdonshire, England, close to Peterborough. Noted for its brickfields. Pop. 8000.

Fleurance, tn. of France in the dept. of Gers and the arron. of Lectoure, 25 m. S. of Agon. It manufs. gloves and liqueurs. Pop. 3400.

Fleur-de-lis, heraldic device in armorial bearings of many countries, but it is especially associated with the royal house of France. The design is based on the white lily, and shows three flowers joined together, the central one erect and the



FLEUR-DE-LIS

other two bending outward. In India and Egypt it was the symbol of the life and resurrection of the god Horus. Some people think it represents the white iris, the 'flower de luce' of Shakespeare. In Rom. and Gothic architecture it is a favourite ornament.

Fleurus, mkt. tn. of Belgium in Hainaut, situated 15 m. W. of Namur and 7 m. N.E. of Charleroi. It is noted for three important battles. In 1622 the Gers., under the duke of Brunswick and Count Ernst von Mansfeld, gained a victory over the Spaniards. In 1690 the Fr. under Luxembourg defeated the allied Dutch and Ger. forces, who were led by the prince of Waldeck. In 1794 the Fr. under Jourdan defeated the Austrians under the duke of Coburg. Pop. 6500.

Fleury, André Hercule de (1653-1743), Fr. cardinal and statesman, b. at Lodève. In 1679 he obtained the post of chaplain to Queen Maria Theresia, wife of Louis XIV., and in 1698 he became bishop of Fréjus. He was made a cardinal in 1726. He was over seventy when he became first minister for Louis XV., though he refused the title. His financial administration was such that the usual deficit was turned into a surplus of 15,000,000 livres. His foreign policy was always peaceful. His severe economies found him unprepared for the war of the Polish Succession (1733), though through it Louis XV. gained Lorraine. In 1741 F. was again forced into a war with which he had no sympathy, that of the Austrian Succession. He d. soon after the evacuation of Prague.

Fleury, Claude (1640-1723), Fr. eccles. historian, b. at Paris. In 1689 he was appointed sub-preceptor to the dukes of Anjou, Burgundy, and Berry. He was then presented with the rich priory of Argenteuil. In 1691 he commenced his great work, the *Histoire ecclésiastique*, pub. in 20 vols., and continued by J. C. Fabre and Goujet. He wrote many other works, among them *Histoire du droit français* (1674) and *Mœurs des chrétiens* (1682).

Fleury, Flory, or Flowery, in heraldry, indicates that the object is decorated with the fleur-de-lis. The cross flory is a cross of the fleur-de-lis. The flowers at the termination turn downwards. The F. differs from the cross flory by its having a line between the ends of the cross and the flowers.

Flexile Collodion, see COLLODION.

Flies. All insects which belong to the Diptera (q.v.) are commonly called F. This order comprises many families, and is widely distributed over the earth's surface, though certain species are limited to particular dists., as *Glossina morsitans*, the tsetse-fly, to equatorial Africa. *Musca domestica* is the specific name for the common house-fly; *Calliphora erythrocephala*, the blue-bottle; Culicidae, the gnat family, etc., may be found under their respective headings.

Flight, see FLYING.

Flight-lieutenant, commissioned officer in the R.A.F., holding rank equivalent to a naval lieutenant or an army captain.

Flight, Theory of, see under AERONAUTICS.

Flinders, Matthew (1774-1814), Eng. hydrographer, navigator, and explorer. He was b. at Donington, Lincolnshire; entered the navy in 1789, and served in the *Bellerophon* at the battle of the "glorious first of June." In 1795 he went as midshipman in the *Reliance* to New S. Wales, and spent his time studying the outlines and bearings of the Australian coast with George Bass, the surgeon of the *Reliance*. He explored the George R., and later much of the then unknown coast S. of Port Jackson. In 1798 he made a survey of the Furneaux Is., N. of Tasmania. In 1801 he sailed for Australia with sev. well-known scientific men in the sloop *Investigator*, and thoroughly explored the coast. On his return in H.M.S. *Porpoise* he was wrecked on a coral reef; on his rescue in the schooner *Cumberland* he was taken prisoner by the Fr. at Mauritius. His captivity lasted six years and ruined his health. He wrote many scientific and interesting works, among them *A Voyage to Terra Australis*, with a vol. of maps (1814). See life by E. Scott, 1914.

Flinders Petrie, see PETRIE, WILLIAM MATTHEW FLINDERS.

Flindersia, genus of Australian hardwood trees, of the Meliaceae family. *F. australis*, of New S. Wales and Queensland, is regarded as one of Australia's finest hardwoods. It weighs over 50 lb. per cub. ft., and its greasy quality makes it more or less impervious to damp. Hence

it is much used in dock works, flooring, shipbuilding, etc. It is yellow in colour, with brown and white streaks, thus being suitable for cabinet work.

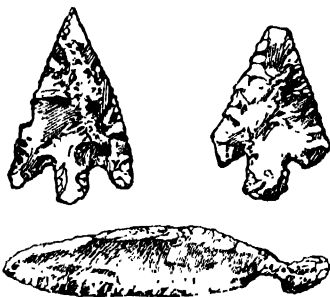
Flinders Range, range of mts. in S. Australia. It extends from the N. of Spencer Gulf, diagonally across the lake dist. of the S., for about 150 m. The heights are not lofty, the chief summits reaching from 1000 to 3100 ft. Mts. Remarkable, Eyre, Serle, Arden, and McKinley are the most important.

Flint, Robert (1838-1910), Scottish philosopher and theologian. In 1864 he became prof. of moral philosophy at St. Andrews Univ., and in 1876 prof. of divinity at Edinburgh Univ. He was also Stone lecturer in 1880, and Craill lecturer in 1887-88. Among his works may be mentioned *Christ's Kingdom on Earth* (1865); *The Philosophy of History in France and Germany* (1874); *Theism* (1877); *Sermons and Addresses* (1899); and *On Theological, Biblical, and other Subjects* (1905).

Flint, hard brown mineral, consisting mainly of silica, found in chalk deposits. It has a specific gravity of 2.6, is frequently harder than quartz, is brittle and breaks with a conchoidal or shell-like fracture. In colour it ranges from dark brown to light yellow or grey. It occurs usually in nodular masses, but under the microscope exhibits a crystalline structure. Its composition resembles that of quartz; it is almost pure silica with traces of lime, iron, and organic matter. When received from the chalk the outer surface is opaque, rough, and greyish. On being broken it has a glassy lustre with cloudy, opaline, and speckled effects in its colouring. Fs. are found usually in bands or layers in chalk, but are sometimes scattered. Layers of F. pebbles are common in riverbeds and beaches in the E. of England, and concretions of the same nature are found under the name of chert in beds of limestone. The origin of F. is, to an extent, a matter of conjecture. The silica composing it was obtained from the skeletons of sponges and radiolaria. It evidently passed into solution, diffused through the porous mass of the chalk, and was precipitated in concretionary masses where the conditions of pressure, etc., were suitable. It appears to have taken the place of chalk, and fossils situated in the area of precipitation were outlined in silica. The uses of F. arise from its hardness, durability, and its abundance in certain dists. It is used for buildings and road making. When used for mending the surface of roads, some disadvantage results from its breaking up in angular fragments with sharp edges. Before the days of the lucifer match, flakes of F. were used for lighting tinder by striking them with a steel edge. They were also used for discharging guns before the introduction of percussion caps; and earlier still, tools and weapons were fashioned out of F. by dexterously breaking off flat or curve-flakes by successive blows. At the present time Fs. are ground down for use in the manuf. of earthenware of a superior kind. See also FLINT IMPLEMENTS.

Flint: 1. Parl. bor. and cap. of Flintshire, N. Wales. It is situated on the Dee estuary, 12 m. from Chester and 173 m. from London. There are important chemical works, smelting and iron foundries, paper mills, etc., and an export trade in potash, soda, coal, and copper. F. Castle was begun in the reign of Henry II. and completed by Edward I. It was here that Richard II. was betrayed to Bolingbroke in 1399. In 1643 the Roundheads captured it. Pop. 7600. 2. Tn. of Michigan, U.S.A., and the cap. of the Genesee co., 68 m. N.W. of Detroit. It is situated on the R. F., and is served by the Grand Trunk and the F. and Pere Marquette railways. There is a deaf and dumb institution here. The lumbering trade is very extensively carried on, and there are large saw mills, etc. Pop. 151,500.

Flint Glass, see GLASS.



FLINT ARROW HEADS AND KNIFE

The arrow heads were found at Mooreock and Wreton, Yorkshire, England; the knife, 4½ in. long, at Pickering, Yorkshire.

Flint Implements, weapons and tools fashioned out of flint, the discovery and study of which form an important branch of archaeological research. Before 1860 it was generally accepted that the hist. of the earth involved a series of catastrophes which marked the end of geological periods, and that man only came into existence in the Alluvial period. The appearance of human remains in the midst of animals of the Drift period was attributed to deep burial until Boucher de Perthes demonstrated, by his account of discoveries in the Drift beds at Abbeville in the Somme valley, that man existed in that period capable of making well-fashioned stone implements. The discovery of these implements has given the name of Stone Age to the period when they were deposited. These found in the Drift beds are simple in form and rudely finished; these belong to the *Paleolithic* or Early Stone Age. Flints found in more recent formations are more specialised in form and highly finished by grinding or polishing; these belong to the *Neolithic* or later Stone Age. *Paleolithic* F. I. are found over a wide area. They occur in the beds of rivs. and lakes and in riv.

gravels in the S. and middle parts of Europe and in S. England. They are not found in Norway, Sweden, and Denmark, nor in Scotland, nor England N. of the Ouse. Three typical forms of the implements can be recognised: the spear-head form from 6 to 8 in. long, the oval form with a sharp edge all round obtained by chipping the stone, and the knife-like form, trimmed or pointed at one end only. It is obvious that at this stage of development the different forms were made to serve for a great variety of purposes. The Neolithic implements discovered in peat-bogs and recent alluvium are differentiated to a high degree. Flints have been discovered plainly indicating special functions, as chisels, scrapers, saws, axes, daggers, etc. See Sir J. Evans, *Ancient Stone Implements of Great Britain*, 1897 and Lord Avebury, *Prehistoric Times*, 1914.

Flint River. Riv. in W. Georgia, U.S.A. with a length of 400 m. It joins the Chattahoochee at the S.W. extremity of the state, and together they form the Appalachicola. It is navigable as far as Albany.

Flints, Liquor of, solution of flint or silica in potash (silicate of potash). This has the property of being soluble in water.

Flintshire, maritime co. of N. Wales, with an area of 264 sq. m. It is the smallest Welsh co., and consists of a main portion with a detached dist. The former is bounded by the Irish Sea, the Dee estuary, Denbighshire, and Cheshire, while the separated part is situated on the r. b. of the Dee, and bounded by Cheshire and Shropshire. The chief streams are the Dee, Clwyd, and the Alyn. The soil is fertile and the co. is an agric. one, about three-fourths being under cultivation; stock-raising and dairy-farming are flourishing industries. There are some thirty coal-mines, but not all are now being worked, and the pre-1914 output of 850,000 tons has declined through the loss of foreign markets. Iron, lead, copper, and limestones are obtained, and there are smelting works and potteries. The prin. tns. are Flint (the cap., pop. 13,500), St. Asaph, Mold, Holywell, etc. Rhyl is a popular seaside resort. Pop. 135,000.

Flintwood, section of the Australian *Eucalypti*, yielding a hard, heavy, and durable timber, much used for railway sleepers, piles, and flooring.

Flinty Slate, siliceous stone, usually black or of a very dark colour. It is employed for testing gold and other precious metals, and has been named on that account 'Touchstone.' The variety originally used was that found in Lydia, Asia Minor.

Flitch, see under DUNMOW.

Flitter-mouse, see BAT.

Floating Battery, vessel which is fully armed with cannon and used as a defence from or attack on an enemy. In the siege of Gibraltar (1779-83) the Fr. and Spaniards used them but without success. They were used again in 1854 by the Eng. and Fr. against Russia.

Floating Beacons, see LIGHTHOUSE.

Floating Bridge may be a permanent

construction used for ordinary traffic across a riv., or temporary, as used in military operations. The former is built of pontoons or boxes of iron, on which is supported a roadway raised considerably above the water, the bridge being securely connected at each end with the shore. In the temporary constructions the pontoons, which may be boats or rafts, are planked over to allow the men to cross the stream. Until it was replaced by a suspension bridge, a good example of a F. B. was that at Calcutta: it was over 1500 ft. long, 48 ft. wide, and was carried on 28 iron pontoons. It was constructed over the Hugli R., the bed of which is too loose and the current too rapid for permanent bridge foundations.

Floating Debt, see under PUBLIC DEBT.

Floating Docks, see DOCK.

Floating Kidney, see KIDNEYS, Diseases.

Flodden, Battle of, was fought on Sept. 9, 1513, about the base of the hill of F. in Northumberland, near Branxton, and 10 m. N.W. of Wooler between the Scots and the Eng. The Scots were under James IV. and the Eng. were commanded by the earl of Surrey. Henry VIII. was before Tournai prosecuting his war against the Fr. in connection with the 'Holy League.' James IV. of Scotland declared himself the active ally of France, crossed the border with an invading army of 30,000 men and took up a position on F. Hill, facing S. Surrey executed a very daring move, which should it fall would cause the Brit. Army to be entrapped and its position rendered hopeless. He crossed the Till and drew up in the rear of the enemy, between it and Scotland. The Scots then took up a fresh position, facing N., on Branxton Hill. Each army was in four distinct bodies. After a devastating attack from the Eng. archery and cannon, the Scots rushed down the hill and came into close quarters. The earls of Huntly and Home got the better of the Eng. right, under Sir Edmund Howard, but only for a time; it soon rallied with the help of Lord Dacre's reserve corps. The Scots right, under Lennox and Argyle, was completely routed by Sir Edward Stanley. James, fighting bravely among his soldiers, attacked Surrey, but Stanley, turning about, attacked the king's corps in the rear. This corps fought to the last man, but the battle was decided—the Scots were most grievously defeated. They had lost their king, 10,000 men, and the flower of all the noble families of Scotland. The Eng. loss was 5000 men. See Scott's *Marmion*, where the battle is described with some accuracy and some imagination, and P. Hume Brown, *History of Scotland*, 1919.

Flogging, or Whipping, is now practically only a statutory punishment, and the statute prescribing such punishment also fixes the number of strokes. Under various statutes F. or W. of males of any age is authorised in the case of robbery with violence, robbery or assault with intent to rob by a person armed with a weapon, conviction as an incorrigible rogue, discharging firearms at or using any substance with intent to injure or alarm

the sovereign; and, as to males under sixteen, for larcenies, malicious damage, and under the Criminal Law Amendment Act, for having or attempting to have carnal knowledge of a girl under thirteen. Women may not be flogged or whipped. F. of male children over seven and under fourteen by order of a magistrate on summary conviction for an indictable offence is inflicted privately by a police constable in the presence of a superior officer and of the parent (if he desires it), and only twelve strokes or less may be given if the offender's age does not exceed fourteen, and only six if he is under twelve. F. may also be inflicted on convicts in prison for mutiny or gross personal violence to a prison officer or servant; but an inquiry must be held before the sentence of F. is carried out. In the navy F. is authorised by the Naval Discipline Act, 1866. Commissioned officers may not be flogged, but a maximum F. of forty-eight strokes may be inflicted on petty officers for mutiny. F. for breaches of discipline in the army was prohibited by the Army Act of 1881, but may be inflicted on persons subject to military law when in prison. A commission appointed to investigate the matter reported in 1938 in favour of its abolition, except in cases of assault by a convicted prisoner upon a prison officer. The sentence of F. or W. was abolished by the Criminal Justice Act, 1918. See further under CRIMINAL LAW.

'Floire et Blanchefleur.' At the time of the Crusades the Franks and the Gks. came into direct contact, and *F. et B.* with sev. other romances of Byzantine origin were put into Fr. without passing through Lat.—probably by oral transmission. Writers in most of the European countries, including Boccaccio in Italy, told the tale from the Fr. version. It is the story of two children who loved each other, were separated, and who came together again happily after passing through many difficulties and dangers. Gaston Paris says that the *châlefabule*, *Aucassin et Nicolette* is another form, though greatly altered, of this story. See the poem in Eng. ed. by A. Lang, 1910 (Early Eng. Text Society).

Flood, Henry (1732-91), statesman, entered the Irish parliament in 1759, and in 1773 held office as vice-treasurer of Ireland. At one time he joined forces with Grattan in order to endeavour to translate into reality their dream of an independent Irish Parliament; but, differing on other matters, especially on Catholic emancipation, they quarrelled, and in 1783 were within an ace of fighting a duel. In that year, though still an Irish member, he was returned to the Eng. House of Commons, but there he was less successful, and made little or no mark in that assembly. He was an able parliamentarian, and one of the greatest orators that Ireland has ever produced. There is a biography by Warden F. (1838).

Floods and Inundations, due most commonly to excessive rains or melting snows, which cause rivs. to rise and overflow their banks. Some rivs. present this

phenomenon annually. The rising and falling of the Nile in this way is no disaster, but has been made by man the basis of Egyptian agriculture. The Mississippi, the Missouri, and the Ohio valleys are liable to F., and these can be predicted with comparative accuracy; great inundations occurred in 1897, in 1927, and in 1937, the last being the most serious since records of the riv. and of its tribs. have been kept, over 1,000,000 persons being made homeless. In China the Hwang-ho R. is especially liable to become swollen after leaving its mountainous region and entering upon its long, low delta course. Levees 70 ft. high proved ineffectual in the disaster of 1887, when 1,000,000 people were drowned and tens of thousands perished by disease and famine ensuing. In 1938 breaches in the bank of the Hwang-ho (or Yellow R.) caused either by the Chinese themselves or by Jap. gunfire flooded thousands of sq. m. of land, killed many thousands of people and held up the Jap. advance in the prov. The breaking up of ice and glacier dams cause inundations in the valleys of the tribs. of the Indus. Riv. F. less catastrophic in nature, but sufficiently disastrous, occurred in France in Jan. 1910, and in England in the summer of 1912. In France heavy rains caused the waters of the Marne, Loire, Yonne, and other rivs. to flood their valleys: this swelled the Seine and Paris was inundated. In England, following a rainfall unprecedented in the records of the meteorological office, many of the E. and midland cos. suffered, especially Norfolk. England suffered disastrous F. in March 1947 through prolonged snow storms and rain. Flood waters spread in the Thames valley, the record levels of 1894 being passed, and below Chertsey the riv. was 3 m. wide. There was an unbroken stretch of water from Windsor to Weybridge and the F. were 6 ft. deep in places. Troops and prisoners of war were drafted into the Fen country for anti-flood work, where there were sev. breaches in the banks of the Great Ouse. The Severn valley was flooded for over 40 m. from Caersws to Shrewsbury. There was extensive flooding in the E. Riding of Yorkshire when the Derwent overflowed its banks from Malton to where it joins the Ouse, a distance of 50 m. Altogether there were F. in some parts at least of thirty cos. and the area mainly affected covered almost the whole of central England roughly in a square with its four corners in mid Wales, Lincolnshire, Somerset, and Essex. 'Tidal waves,' occurring when high winds drive the waters of the sea on to the land at periods of high tides, are a less frequent cause of inundation. Notable F. of this nature occurred in the Netherlands in 1421, but the construction of more and more invulnerable dikes have made the country decreasingly subject to these disasters. Inundation by the sea may cause serious F. as in Bengal in 1876, when 200,000 lives were lost. The W. Indies, the Gulf Coast, the Middle Atlantic States, etc., are liable to inundation at the periods of tropical hurricanes.

Earthquake shocks disturbing the sea may cause inundation of the adjoining land; the catastrophe in which Lisbon was destroyed in 1775 was of this nature. Devastating F. have been caused by the bursting of reservoirs, that of the Bradfield reservoir, Sheffield (1861), is an instance. For the Noachian flood see DELUGE. See also FENS. See C. E. Brooks and J. Glasspoole, *British Floods*, 1928; Institution of Civil Engineers, *Interim Report of the Committee on Floods in Relation to Reservoir Practice*, 1933; and B. D. Richards, *Flood Estimation and Control*, 1944.

Floorcloth, term applied to a number of materials used as substitutes for carpet. These include oilcloth, linoleum (*q.v.*), kamptulicon, corticine, cork carpet, etc. Oilcloth consists of coarse canvas (bur-laps), made of jute or flax, to which a coating of size and sev. coatings of thick oil paint are applied. It is then often ornamented with patterns. This hard and cold F. was partly superseded (1844) by kamptulicon, made of ground cork and indiarubber; it was expensive and is now little used. Cork carpet is the F. now most extensively employed; it is warmer than the others and deadens the sound of the footsteps. It is made of a preparation of ground cork and oxidised linseed oil reduced to a pulp and pressed in a machine; it has a canvas backing. There is more cork in this than in linoleum and the particles are larger.

Floors, name applied to the upper storeys of houses, those above the ground floor. Technically the floor is the surface on which people walk. F. are generally constructed of wood, but in large buildings they are often 'fireproof,' and then flat bricks and iron girders are used. In a single floor, constructed when the span is not more than 15 ft., the joists pass from side to side of the house. A double floor has two sets of joists crossing each other, one for the F. and the other for the ceiling. A framed floor has girders in addition to the two sets of joists.

Floquet, Charles Thomas (1828-96), Fr. statesman, was b. at St. Jean Pie 1-de-Port. In 1876 became a member of the Chamber of Deputies, of which he was president from 1885 to 1888, and Prime Minister in the latter year. In 1888 he wounded Gen. Boulanger in a duel, and in the next year resigned from his office. He was compelled to give up public life, however, a year or two later, owing to his connection with the Panama case.

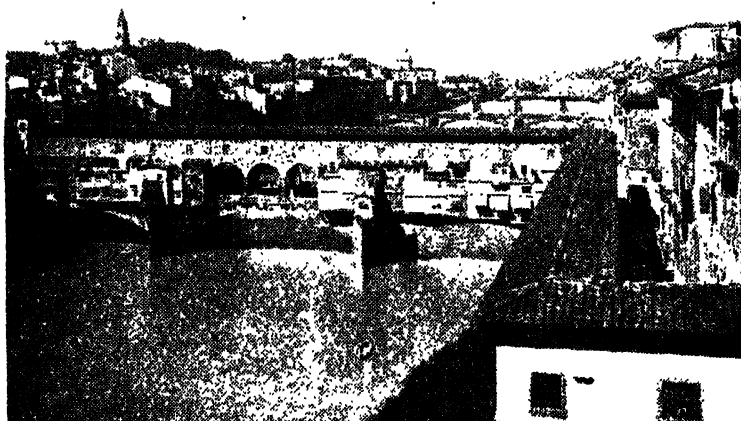
Flora, anct. Rom. goddess of the spring, of flowers, and of the 'flower of youth.' The *Floralia*, a theatrical festival in her honour, lasted from April 28 to May 3, and was characterised by licentiousness and unrestrained merriment.

Flora, term which denotes collectively all the species of plants which are native to a certain dist. or country. Linnaeus was the first to use the word in this sense. It may also be applied to denote the plants of a certain epoch in time, so that we speak of the Miocene flora.

Floral Decoration, see FLOWER DECORATION.

Florence (It. Firenze, Lat. Florentia), city of central Italy, the cap. of a prov. of the same name, and formerly cap. of the duchy of Tuscany. It is situated at the foot of the Fiesole Hills in the fertile valley of the Arno on both banks of the riv. It is about 180 ft. above the sea level, 194 m. N.W. of Rome. F. is well called *la città dei fiori*, for flowers grow in luxuriance in its gardens and fields, and the surrounding plain and sloping hills yield an abundance of wheat, Indian corn, vines, olives, fruit trees, the pine, ilex, poplar, etc. The great portion of the city is on the N. bank of the riv., which

dral, Santa Maria del Fiore, is its chief building. It was begun by Arnolfo di Cambio in 1296, and consecrated in 1436, when it was called del Fiore (of the flower) either after the name of the city or in reference to the municipal arms, a red lily on a white ground. Its detached campanile was begun by Giotto, and Brunelleschi designed its dome. In front of the *duomo* is the octagonal baptistery of San Giovanni, the old cathedral of F. Of its three splendid bronze gates one is the work of Andrea Pisano (1330), and the other two, called by Michelangelo in admiration 'The Gates of Paradise,' are



FLORENCE: THE PONTE VECCHIO

The bridges in the background were destroyed in 1944

W. I. Mansell

before 1944 was spanned by four imposing bridges. Many suburbs have sprung up beyond the ant. walls of which a few towers only remain. Extensions of the city took place during 1864-72, when F. was for one year the seat of the It. Gov., and for eight years the cap. of Italy; further growth came about from immigration from 1881. The city with its suburbs, riv., bridges, cupolas, towers, market-places and fine squares, its streets and encircling boulevards constitute a marvellous panorama well seen from the Piazza Michel Angiolo, the highest point of the Viale dei Colli, a magnificent 'drive' of modern construction, but many of the famous monuments of the city have gone as a result of the fighting in 1944, particularly on the N. bank of the riv. round the Ponte Vecchio, a fourteenth-century bridge which has a covered passage built over a row of goldsmiths' shops, linking the Palazzo Vecchio with the Pitti Palace. The *duomo* or cathe-

Lorenzo Ghiberti's masterpiece (1403-47). Other famous churches are Santa Maria Novella, Santa Croce (F.'s pantheon, with frescoes by Giotto), (the roof was pierced by a shell, but a recent survey disclosed that the roof timbers are in a dangerous condition throughout, due to extreme old age), Santo Spirito (roof was pierced by shell-fire in sev. places), and San Marco, whose convent has frescoes by Fra Angelico and was the home of Bartolomeo and Savonarola. F. possesses four important libraries containing many rare MSS., illuminated missals, and Bibles, etc.; they are the Biblioteca Nazionale, the Marciana, the Laurentiana, and the Riccardiana. Rich collections of medieval artistic and historical treasures are stored in its galleries and museums, the chief among which are the Uffizi Gallery and the Pitti Palace (the Uffizi Gallery suffered much damage from blast and the corridor linking it with the Pitti Palace was badly wrecked). Here are masterpieces by

Raphael, Andrea del Sarto, Perugino, Ghirlandajo, Botticelli, the Lippis, etc., with some fine sculpture. Priceless archaeological collections are to be seen in the museum of the *duomo*, the Accademia, and the Casa Buonarroti. The streets of F. are unique for their splendid medieval palaces, the old residences of the Florentine noble families; the Palazzo Vecchio, now the tn. hall, once the seat of gov. of the republic of F., and the Palazzo Riccardi, now the prefecture, once the residence of the Medici, are among the most celebrated. Many of the old palaces have been restored as far as possible to their pristine grandeur, but some were destroyed in the Second World War. The prin. industrial occupations of the Florentines are those connected with vintaging and oil-making, together with certain artistic handicrafts such as jewel, mosaic, majolica and porcelain making, straw-plaiting and the fabrication of silk and woollen textures. The univ. of F. is one of the first in Italy, and there are many trade and professional schools with some important learned societies, such as the Accademia della Crusca, for the study of the It. language, and the Società Danteica. There is an agric. institute, a high school of forestry, and a women's training college. The Brit. Institute, founded in 1818, occupies the famous palace of the Antinori. Pop. 322,000.

History.—Florentia, an old Rom. colony, was rebuilt by Julius Cæsar, 59 B.C., to serve as a military post at the ford of the Arno. It rose into some importance under the Carolingian emperors, who included it in the Tuscan margravate. It was bequeathed in feudal legacy to Pope Gregory VII. by the celebrated Countess Mathilda (1115), and became, in consequence, the scene of conflicts between the popes and the emperors. F. stood for the papacy, but early began to develop a spirit of local patriotism and of freedom, and soon became bold and strong enough to close her gates against Frederick Barbarossa. The Florentines were already great traders, and they now formed themselves into *arti* or trade guilds, and in order to hold public office it was necessary to belong to one of these guilds. They waged war against the feudal lords whose castles were in the neighbourhood, and who had interfered with their trade, forcing them to become citizens and to live in F. at least three months in the year. They gradually threw off the rule of the emperors, and after the death of Frederick II. in 1250 F. was proclaimed a republic. In the twelfth and thirteenth centuries F. was involved in the struggles between the Guelfs and the Ghibellines, the former the democratic-republican-papist party, the latter favourable to the aristocrats and the emperor. F., which was chiefly Guelf, formed the 'Tuscan League' with other cities, and fought against Pisa, Siena, and other Ghibelline tns. The rich burghers with their guilds now governed F., taking the power from the nobles by the 'Ordinances of Justice.' The executive power, formerly invested in the *podestà*

and captain of the people, was now transferred to the *priori* (eight members) and the *gonfaloniere* of justice. And now F. was torn by the feuds of the Nerl and Bianchi ('blacks' and 'whites'), two factions born of the opposition of the nobles to the new constitution. Dante was one of the *Priori*, and was banished with the whites in 1302. In spite of the constant fighting entailed by these feuds, F. grew in splendour and prosperity—fine churches, palaces, and libraries were built, Florentine cloth merchants, jewellers and goldsmiths visited all the foreign markets and estab. banks everywhere, about 400,000 gold florins were minted every year, and the city was a centre of art and letters. All this was made possible by the solidarity of the trade guilds. In 1348 the city was decimated by plague, the Black Death, described by Boccaccio. From 1434 to 1527 the Medici held sway, and under them F. attained the summit of its magnificence. Cosimo, the first of the name, a princely merchant, was very popular, and rose to a position of great power. Lorenzo de' Medici, called the Magnificent, was the most famous and powerful of the family. They were seven times banished for aiming at sovereign power, and were many times recalled. They patronised art and letters, and a school of painters came into being, represented by Cimabue, Leonardo, Giotto, the Lippis, Del Sarto, and others. F. was the centre of the Renaissance. But the succeeding members of the Medici family degenerated in character, and with them to some extent, the Florentines. The work of Savonarola, who tried to reform the manners and morals of the citizens, and to re-establish a democratic gov. after the city had been delivered from the Medici, took place in the latter part of the fifteenth century. He was abandoned by the people and burnt at the stake. F. ceased to be an independent republic in 1532 to become the cap. of the grand-duchy of Tuscany. In 1808 Tuscany, and F. with it, was annexed to the Fr. Empire, and in 1865 the city became the cap. of the kingdom of Italy and remained the cap. until 1871. F. is the bp. of Dante (1265), Donatello, the sculptor (1383), Ghiberti (1378), of Machiavelli (1469), and of Florence Nightingale.

In the Second World War, S. African troops reached the outskirts of the city on Aug. 4, 1944, and on the 11th the Allies took F. The allied forces had been provided with booklets listing all buildings in Italy which, by reason of historic associations or artistic value, were exempt from military use and had to be protected against avoidable damage. Under F. might be read: 'The whole city must rank as a work of art of the first importance.' Such was the allied armies' estimate of a city which the Gers. chose to violate. The great monuments, most of which lie N. of the R. Arno, escaped undamaged because, though the Gers. held the N. bank, no Brit. troops deliberately abstained from firing upon them. No damage of any significance is attributable to allied action. But to the historic

tn. of F. the damage was very heavy. On the N. bank the heart of the old city round the famous Ponte Vecchio, with all its associations, is gone. The bridge itself escaped serious damage, but the old houses on it suffered severely from blast, and most of the old houses on the S. bank were totally destroyed. The Gers. blew up all the other five bridges, though some of the sculpture from the Ponte S. Trinita was recovered by divers. As early as March 1944 the Gers. had made a photographic survey of the area they subsequently mined and ruined, including the narrow approaches. On the S. side of the riv. the whole of the Via de' Guicciardini, from the Pitti Palace to the riv., was destroyed, and the whole of the famous view looking up the riv. to the Ponte Vecchio, with the medieval houses reflected in the water, is lost for ever, together with three of the old Florentine towers, and the sixteenth Bagno del Medici. Twelve palaces were either completely destroyed or ruined beyond repair, amongst them the Casa Macchiavelli and the Casa del Giambologna. The Casa del Torre de' Bardi collapsed, and with it the Columbaria library and its MSS., though half these latter and most of the anc. library were saved by the prompt action of the Allied Monuments, Fine Arts, and Archives officers. On the N. side of the riv. other old towers were destroyed, including the Torre degli Amidei, the best-preserved of all the Florentine towers. Among palazzi destroyed or damaged were the Acciaiuoli, de' Angelis, and Buondelmonte. A great loss was that of the old houses—the Piazza del Pesce, right up to the church of S. Stefano, which itself was damaged, the Via Por S. Maria, and with these have disappeared all the most characteristic remains of medieval F. By contrast the area which the Gers. held against allied attack was relatively immune, and, apart from the Columbaria, the libraries and archives did not suffer. From the galleries of F. all the more important pictures had been removed to places of safety outside the city limits. Of the villas round F. many suffered damage, but the most important fared best on the whole. It may be mentioned that it will be possible to make an accurate reconstruction of the original bridge of Santa Trinita. Some of the famous towers were repaired or reconstructed. The Uffizi-Pitti corridor was re-roofed. There was widespread damage to sev. churches, particularly to roofs and windows, and some frescoes. S. Stefano al Ponte was heavily damaged by Ger. mines, but the facade was completely rebuilt with the original stones. Santa Trinita's roof was holed, and the frescoes shaken, but those by Ghirlandajo and Lorenzo Monaco were unharmed. Considerable damage was done to the roof and windows of the Pitti Palace by shell fire and explosions. The Uffizi Gallery was severely damaged throughout by explosions, and almost all the windows were smashed and decorative frescoes badly damaged. See *Works of Art in Italy: Losses and Survivals in the War*. Two parts. H.M.S.O., 1945, 1946.

See G. A. Capponi, *Storia della repubblica Firenze*, 1876; Margaret Oliphant, *Makers of Florence*, 1876; F. Perrens, *L'Histoire de Florence*, 1877-92; P. Villari, *The Two First Centuries of Florentine History* (Eng. trans.), 1894, and *Life and Times of Savonarola* (Eng. trans.), 1888; J. Ruskin, *Mornings in Florence*, 1901; E. Staley, *The Guilds of Florence*, 1906; J. Wood Brown, *Florence Past and Present*, 1911; F. Schidlmann, *Florenz und die Kunst Toskanas*, 1929; T. Borenius, *Florentine Frescoes*, 1930; G. Truc, *Florence et les Medicis*, 1936; and S. Antal, *Florentine Painting and its Social Background*, 1947.

Florence: 1. Prov. of Central Italy, cap. F. It embraces part of the basin of the Arno, is traversed by the Apennines, has an area of 2265 sq. m. and a pop. of 1,000,000. It produces wine, oil, the olive, and flowers, and carries on silk weaving and sheep breeding. 2. City of Alabama, U.S.A., co. seat of Lauderdale co., situated on a plateau 200 ft. above the Tennessee R., on its N. bank. Its industries are connected with lumber, coal, and iron-mining. Pop. 15,000. 3. Co. seat of F. co., S. Carolina, U.S.A. Its industries include tobacco and cotton growing. Pop. 16,000.

Florence of Worcester (d. 1118), O.E. chronicler. He was a monk of Worcester. He appears to have lived most of his life, and certainly d., in the Benedictine monastery at Worcester. We know nothing else about him. He wrote the *Chronicon ex Chronicis*, beginning with the creation and ending in 1117. A certain John of Worcester continued the work up to 1141. It is interesting to compare the work with other Eng. chronicles till his independent work from 1108; the main part appears to have been taken from the chronicle of Marianus, an Irish monk who lived at Fulda. It was trans. by B. Thorpe in 1848, and by T. Forester in 1854, for Bohn's Antiquarian Library.

Florentia, see FLORENCE.

Florentinus, Rom. jurist, was the writer of *Institutiones* in sev. books. There is no other work by which he is known, but many extracts from his book are still preserved.

Flores, Juan José (1800-64), Sp.-Amer. soldier, b. at Puerto Cabello, Venezuela, who became first president of Ecuador, and fought under Bolívar in the War of Independence. He was commander-in-chief in the campaign against Peru, and when Ecuador became independent (1830) he framed her constitution and was elected president.

Flores: 1. Is. of the E. Indies, belonging to the Dutch. It has an area of about 5850 sq. m., the interior being but very little known. Rice and maize are grown here, while sandal wood and cinnamon are among the exports. Pop. 1500. 2. Is. in the Atlantic Ocean belonging to the Azores group. It is one of the most westerly of the group, and is very fertile. The cap. is Santa Cruz. Sir Richard Grenville's defence off Azores in 1591 is commemorated in Tennyson's *Revenge*. Pop. 7300. 3. Dept. of Uruguay, S.

America. Its chief tn. is Trinidad. Area 1744 sq. m. Pop. 36,100.

Florez, Enrique (1701-73). Sp. historian, was b. at Valladolid, and joined a religious order when quite young. He afterwards devoted all his time to the writing of hist., his chief works being *España Sagrada* (1747-73) and *Memorias de las Reynas Catolicas* (1770).

Florian, Jean Pierre Claris de (1755-94), Fr. poet and writer of romance. He was b. at the château of Florian, near Sauve. His uncle, the marquis of Florian, introduced him to Voltaire, who greatly influenced his ideas on literature. He obtained a commission in a dragoon regiment, but at the beginning of the revolution he retired to Sceaux, where he was captured and imprisoned. He only lived a few months after his release. One of his first literary works was an eclogue entitled *Ruth*, crowned by the Fr. Academy in 1784. He wrote many poems and comedies; among them are *Le Bon Ménage*, *Numa Pompilius*, and *Galatée*. In 1792 he wrote his famous *Fables*, and trans. *Don Quixote* into Fr. His style was sentimental, and his comedies are delicately expressed with a certain amount of charm and piquancy. He was elected to the Fr. Academy in 1788.

Florianopolis (formerly Desterro), city and seaport of Brazil, which is named after Marshal Florian Poixoto, president of Brazil (1891-94). It is situated on the W. side of the is. of Santa Catharina off the coast of the state of Santa Catharina, of which it is the cap. Agriculture is the prin. industry and dairy produce is largely exported. The port affords good accommodation for smaller vessels. A suspension bridge, called the F. suspension bridge, which adjoins the city, was completed in 1926. Pop. 49,000.

Florida (Land of Flowers), 'peninsula' or 'everglade' state, the most S. of the states of U.S.A. Its length is 400 m., its average width 95 m., and its area 58,560 sq. m., about 4298 of which is lake and riv. area. Its surface seldom rises more than 200 ft. above the sea level; lakes, swamps, and savannah lands are frequent in the centre, while the S. is characterised by submerged saw-grass plains called everglades, whose pure water, about 1 ft. deep, abounds in fish. To these everglades F.'s largest lake, Okeechobee (1200 sq. m.), contributes a subterranean supply. The prin. rivs. are St. John's, the Withacochee, and the Caloosahatchee. The climate of F. is so equable and healthful that the state has been called the Amer. Riviera, and has become a favourite health resort; immense mineral springs enhance its value. The leading industries are those connected with agriculture (cereals, the peanut, potato, tomato, beans, tobacco, celery, etc., are cultivated), cigar-making, lumber (the yellow pine, cypress, red cedar, oak, and catalpa grow abundantly), phosphate rock, and fruit-growing (orange, pineapple, grapefruit, etc.). The pop. (1940) was 1,897,400, and (1946) 2,310,300. Of the first total the foreign-born white numbered 70,000, and one-third of the

whole are coloured. The chief tns. are Tallahassee (cap.), 12,000; Jacksonville, 206,400; Miami, 192,100; Tampa, 124,400; St. Petersburg, 85,100; Orlando, 50,100; Pensacola, 43,300; West Palm Beach, 40,500. The state provides higher education in a univ. of the state of F. at Gainesville (founded 1905), with 3000 students, a state college for women, founded at Tallahassee in 1905 (2000 students), and a college for Negroes at Tallahassee (800 students). F. was discovered in 1512 by Ponce de Leon, was ceded by Spain to England in 1763, became an Amer. possession in 1821, a ter. of U.S.A. in 1822, and was admitted to statehood in 1845. Miami and Palm Beach, the two chief resorts for residents and visitors, have greatly increased in popularity of recent years and the trade of F. has thereby received a very helpful stimulus. See C. H. Brevard, *A History of Florida from the Treaty of 1763 to Our Own Times*, 1924-25; F. W. Dau, *Florida, Old and New*, 1934; and Kathryn T. Abbey, *Florida: Land of Change*, 1941.

Florida, cattle-rearing dept. of Uruguay, whose cap. of the same name is about 70 m. N. of Montevideo. Area 4763 sq. m. Pop. 106,400.

Florida Reefs, or Keys, bow-shaped chain of small is. and sand reefs (or keys), extending S.W. for 220 m. from Cape Florida. They parallel the E. coast of F. and enclose an inland waterway. The ports Fernandina, Jacksonville, and Key West are on the keys. There is an active sponge industry.

Florin (Fr. *florin*, from It. *fioreno*, a florin, the word being derived from *fiore*, a flower, because the coin bore a lily on the obverse), name first given to a gold coin struck in Florence in the eleventh century. It was called also a 'fioreno' in Europe, and was much used in commerce, other countries issuing similar coins. In England Edward III. ordered every pound of gold to be coined into fifty fiorences (value six shillings each); and the 'gulden' and 'guilders' of Germany and Holland came into being. Edward's fiorences were soon discontinued, but in 1849 Queen Victoria issued a silver F. (two shillings), which became known as the 'godless' or 'graceless' F., because the words *Dei Gratia* were omitted; this omission was rectified in 1852. The double F. of 1887 was discontinued in 1890.

Florina (Flurina), dept. of Gk. Macedonia. Pop. 152,800. Cap. F. (10,500).

Florio, John (c. 1553-1625), Eng. author and translator, was the son of It. Protestants, and was b. in London, where his parents had taken refuge. He became a prof. of languages at Oxford, and in 1603 was appointed to read It. with Queen Anne, being made groom of the chamber in the following year. He also taught Prince Henry, son of James I. He is best known by his trans. of Montaigne's essays (1603). Among his other works are *Florio, his first fruites which yield familiar speech, merie proverbes, wittie sentences and golden sayings, also a perfect Introduction to the Italian and English Tongues* (1578) and *A Worlde of Wordes or most Copious*

and *Exact Dictionarie in Italian and English* (1598).

Floris, Frans (1516-70), Flemish painter whose real name was de Vrienat, b. at Antwerp. He began as a sculptor under his father, and later went to Liège, where he studied painting under Lambert Lombard. He then visited Italy, and while in Rome made a careful study of the work of Michelangelo, and his work shows very plainly the influence of that great master. In 1540 he opened a school of painting in Antwerp. Among his best works are 'The Last Judgment' (in Brussels); 'The Fall of Rebellious Angels' (in Antwerp). His brother Cornelis (1514-75) was an architect and sculptor, whose chief work was the tn. hall at Antwerp.

Florists' **Flowers**, see FLOWERS, FLORISTS'.

Florus, historian of Rome, who wrote during the reign of Hadrian (A.D. 117-38). Very few definite facts of his life are known, but his work was a hist. of Rome from the foundation of the city to the time of Augustus. It is founded principally on Livy's work, and although its arrangement is good it leaves much to be desired in other ways. One of the best known eds. is that by Halm (Leipzig, 1879).

Flory (in heraldry), see FLEURY.

Flotation, study of the conditions under which bodies float. If the weight of a body be greater than the weight of the fluid displaced, the body will tend to sink; if the weight of the body be equal to that of the displaced fluid, it will rest anywhere in the fluid; if the weight of the fluid displaced be greater than the weight of the body, the body will be forced upwards to the surface, so that it floats partly immersed. As the pressure upwards upon a floating body must be equal to the pressure downwards due to the weight of the body, it follows that the weight of the fluid displaced is equal to the total weight of the body. It also follows that the pressure upwards shall act in the same straight line as the pressure downwards, so that the centre of gravity of a floating body is in the same vertical line as the centre of buoyancy, or the centre of gravity of the displaced fluid. If the body be slightly displaced, the moment of the two forces tends to restore it to its original position if the centre of gravity be below the centre of buoyancy, but tends to overturn it if the centre of gravity be above the centre of buoyancy; in the former case the floating body is in stable equilibrium, in the latter it is in unstable equilibrium. Hence the necessity for keeping the centre of gravity of a ship as low as possible. A certain amount of displacement is inevitable, and if the centre of gravity be raised by heavy deck loads there is risk of capsizing, while the lowering of the centre of gravity by ballasting tends to ensure stability.

Flotow, Friedrich, Baron von (1812-1883), Ger. composer, b. at Teutendorf in Mecklenburg. His first great success was *Le Naufrage de la Méduse*, an opera produced in 1839, *Alessandro Stradella*, in 1844, and *Martha*, in 1847, being equally popular. Among his later operas may be

mentioned *Indra* (1853); *La Veuve Grapin* (1859); and *L'Ombre* (1869). The characteristics of his works are liveliness and grace, combined with pleasing melodies.

Flotsam, **Jetsam**, and **Ligan**, names given in Eng. law to goods lost at sea as distinguished from *wreck* or goods which come to land. *Flotsam* 'is where goods continue swimming on the surface of the waves' (Blackstone). *Jetsam* or *jettison* connotes goods cast into the sea which remain under water; *ligan* are goods which are attached to a cork or buoy in order that they may be found again. F., J., and L. are adjudged to the Crown if no owner appears within a year and a day, while *wreck* belongs to the Crown in any case.

Flounder, or *Pleuronectes flesus*, flat fish (q.v.). It is common to the N. temperate and Arctic seas of both hemispheres, and is almost as much a fresh-water fish as a sea fish. The F. rarely exceeds a length of 12 in., or a weight of 1½ lb., but those caught in America are larger and heavier. Nearly all Fs. are excellent eating.

Flour (the word is a variant of *flower*), in general language the powdered grain of wheat. When the word is used to denote the powdered grain of other cereals, a qualifying term is added—rye F., barley F., etc. Wheat F. is used for making bread in preference to the F. of other grains, not on account of any superiority in its nutritive properties, but because of the presence in it of a special gluten, a highly tenacious, sticky substance which enables the dough to retain the carbonic acid gas introduced into it in the form of yeast or baking powder. This makes the bread light and spongy. Dough made with the F. of other grains is granular, and this allows the gas to escape. The following comparison shows that in essential nutritive constituents other grains equal or surpass wheat:

	Protein	Sugar.
	starch, etc.	
Wheat	11.9	71.9
Oats	11.8	59.7
Barley	12.4	69.8

The best wheat (the richest in gluten) comes from Minnesota, Manitoba, Hungary, and Russia. Great Britain imports F. from Canada in rapidly increasing quantities. The most recent statistics of the values of different kinds of cereals imported into Great Britain from Canada and Australia are as follows: Wheat (1948) £23,602,364. Barley—Australia (1948) £2,414,000. Oats—Canada (1947) £1,997,268. Meal and flour—(including semolina) (1948) Canada £17,939,556; Australia £7,585,188. Statistics, however, show considerable fluctuations. In 1938 wheat imports from all countries were £38,627,554. In 1948 £26,574,678; oats £537,520 in 1938 and £9,431,417 in 1948. The total imports of grain and F. from Canada in 1938 were 44,379,178 cwt., valued at £18,592,293; in 1948 79,369,482 cwt., valued at £85,639,121; from Australia (1938) 35,994,636 cwt., valued at £14,392,095; (1948) 24,094,247 cwt.,

valued at £40,266,251. From the Argentine republic the import figures are: 1938, 24,262.313 cwt., valued at £8,190,189; 1948, 30,833,458 cwt., valued at £43,301,517.

Flourens, Marie Jean Pierre (1794-1867), Fr. physiologist, b. at Maureilhan, Hérault. He began his career by assisting Cuvier in 1828, and later received an appointment at the Jardin du Roi. He afterwards held a professorship of the Collège de France, became perpetual secretary of the Academy of Sciences, in 1840 a member of the Fr. Academy, and in 1846 was made a peer of France. He wrote many works on physiology and anatomy, among them *Anatomie générale de la peau et des membranes muqueuses* (1843) and *Théorie expérimentale de la formation des os* (1847).

Flourish, literally in O.E. a fanfare but in modern musical terminology a short figure used as an embellishment rather than as a theme.

Flour-milling. *Ancient method.*—More than 6000 years ago people ceased to eat grain in its wild state and began to break it up with a rude kind of pestle and mortar. Later a primitive hand mill came into use. This consisted of two stones with roughened surfaces between which the grain was ground. The next mill evolved was the *quern*, formed of two circular stones, the upper revolving on the lower, to which it was attached by a metal or wooden pin. The corn was introduced between the stones by means of a funnel in the upper stone which had also a small hole near its edge into which a stick was inserted to serve as a handle. The quern is still used by semi-civilised peoples, and in remote parts of Ireland, the Hebrides, and the Shetlands. Down to 1874 the grindstone remained the basis of the flour-mill, but the 'power' was supplied by animal labour, by wind, and by water. Grindstones are still used in the smaller mills. They are made of *buhr*, a very hard silicate. They are from 4 to 6 ft. in diameter, and their surfaces are grooved or furrowed from centre to circumference. The 'hopper' supplies the grain through the centre of the upper stone; the wheat is pushed along the grooves and broken upon the ridges.

Modern method.—In modern F. iron or steel rollers worked by steam have taken the place of grindstones. The first successful steam mill was erected in London in 1784, and iron rollers were first used in 1840, following their introduction in Budapest. Hungary became the world centre for F. on account of this improvement. Minneapolis soon adopted it, becoming in her turn the world centre, and remaining so to the present day. From 1880 the system of roller-milling has been in operation in all large mills.

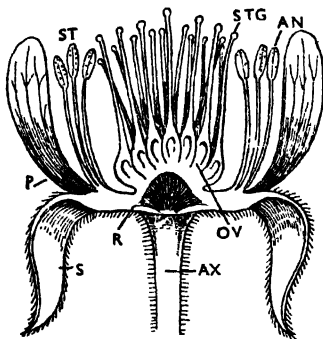
The first operation consists in removing the husk (*bran*) from the grain. That this may be successfully done, that is, without particles of bran becoming incorporated with the flour, the grain is 'tempered' (damped) after being thoroughly cleaned in revolving cylinders. Then it is passed through sev. pairs of grooved iron rollers, each pair having finer grooves than the

last as well as a different angle of grooving and a different rate of movement. Two products result: bran and 'middlings' or 'semolina.' Next the semolina is 'purified,' i.e. the finer and coarser particles are assorted, and any 'offal' or extraneous particles of tissue and fibre carried off in revolving, gauze-covered cylinders. Flour-making proper is the object of the next operation. The semolina is passed through various pairs of smooth rollers and 'flour' results, but as the particles are not even now of uniform size, it is further treated in a 'dresser,' or revolving cylinder covered with fine Swiss silk. The product alone which is able to pass through the meshes (12,100 to the sq. in.) is accepted as flour, the remainder, a fluffy tissue, is used as food for cattle. See R. Bennett and J. Elton, *History of Corn Milling*, 1898.

Flower, Sir William Henry (1831-99), Eng. anatomist and zoologist. He held the curatorship of the Hunterian Museum of the Royal College of Surgeons in 1861; and, in 1884, the directorship of the Brit. Museum of Natural Hist. He wrote *An Introduction to the Osteology of the Mammalia* (1870); *Fashion in Deformity as illustrated in the Customs of Barbarous and Civilised Races* (1881); *The Horse* (1891); and *Essays on Museums and other subjects connected with Natural History* (1898).

Flower, shoot bearing a number of leaves modified for the purpose of reproduction, and frequently with other leaves forming an outer investment. A typical F. consists of four whorls of floral leaves, the carpels, constituting the pistil, stamens, petals, and sepals, but there are many and varied modifications from this type. The pistil and the stamens are the essential organs of a plant, because seeds cannot be formed if these are absent. The petals collectively form the corolla, and the sepals constitute the calyx. When sepals and petals are indistinguishable from one another, as in daffodil and many monocotyledons, etc., a perianth occurs. In dicotyledons the calyx, when present, is usually green as in primrose, and of a protective nature, but it may be yellow as in marsh marigold, or blue as in larkspur. The corolla is usually brightly coloured, or white; sometimes it is absent altogether, as in *Thalictrum*, the rue. A typical stamen consists of a stalk, or filament, bearing a terminal anther which contains the pollen. The pollen is the male element in the sexual process. The pistil is the female organ and consists usually of three parts, the ovary or seed bag, made up of carpels, above which is a shaft-like tube, the style, at the apex of which is the stigma, the receptive organ for the pollen grains. A F. is said to be complete when both calyx and corolla are present; it is incomplete if one or both of these envelopes are absent. If both stamens and pistil occur together, the F. is said to be perfect or hermaphrodite; it is imperfect or unisexual when only one class of essential organs is present, and the Fs. are then either staminate (male) or pistillate (female). Where the floral leaves in each whorl are similar in size and shape, the F. can be divided symmetrically

in sev. directions, and is said to be regular, as in buttercups; otherwise it is irregular, as in pears, orchids, etc. Much of the classification of plants is based upon the characters of the F., thus dicotyledons are subdivided into polypetalæ and gamopetalæ. The Fs. of the former have petals free from one another, as in buttercup; those of the latter have their petals joined to one another, so forming a tube, cylinder, etc., as in primrose. In dicotyledonous plants the parts of the F. are usually in fours or fives or their multiples; thus a primrose has five sepals, five petals, five stamens, and a pistil made up of five carpels; members of the pink family (Caryophyllaceæ) usually have ten sta-



DIAGRAMMATIC REPRESENTATION OF THE
STRUCTURE OF A FLOWER

AX, axis; R, receptacle; S, sepal; P, petal; ST, stamen; AN, anther; OV, ovary; STG, stigma.

mens. Monocotyledons, on the other hand, have their parts in threes or multiples; thus in the lily there are six perianth leaves, six stamens, and three carpels. Mention must be made of the receptacle, a very important structure in the classification of flowering plants, as upon it depends the insertion as it is called, of the floral leaves. Thus if sepals, petals, stamens, and carpels spring one beneath the other from a more or less conical receptacle, such as occurs in the buttercup, the F. is said to be hypogynous and the ovary is superior. It is perigynous when the stamens spring from the same level as the ovary, as in rose, blackberry, etc.; and it is epigynous when the petals and stamens are inserted above the ovary, as in the lily, and members of Umbelliferae and others; in this case the ovary is said to be inferior.

In order that a F. may produce seed, fertilisation is necessary, and pollination is a preliminary step to this end. By pollination is meant the bringing of the pollen into contact with the stigma of the pistil, and there are all sorts of wonderful devices in plants to effect this end. There are two chief ways by which this is brought about, one is by the agency of insects, and sometimes by birds, and the

other is by wind. Entomophilous plants, as they are called in the first case, are attractive either by their colour or smell or both, and the insect visits the F. for booty of pollen or honey, and incidentally causes the pollen of one F. to fall upon the stigma of another. The ways in which certain Fs. are specially adapted for visits from certain insects, and the relative positions of stamens and pistil so as to be used to the best advantage, is a subject in itself. Fs. which open in the evening are usually of a pale colour and have a strong smell—they are pollinated by moths and evening insects. Anemophilous plants, those which are wind-pollinated, often bloom before the leaves are developed, their Fs. are usually inconspicuous, they produce no honey, they have no smell, and pollen is produced in large quantities to atone for waste; grasses and many trees belong to this type. It has been proved by experiment that cross-fertilisation, i.e. when the pollen contents of one F. are brought into contact with the pistil contents of another F., whether on the same or on a different plant (but always of the same species), is more beneficial than self-fertilisation, but often if cross-pollination does not take place, the plant becomes self-pollinated. In some cases, however, self-pollination is impossible, for various reasons: (1) The anthers and stigma are in such relative positions to one another that pollen cannot possibly reach the stigma of the same F., e.g. aristolochia. (2) The stigma and anthers of the same F. mature at different times; Fs. in which this occurs are either protandrous, when the anthers are first developed and have already shed their pollen when the stigma of the same F. is capable of receiving it; or they are protogynous, when the stigma is withered before the pollen is shed; this is the more uncommon of the two forms, but occurs in arum and in the figwort, etc. Most composites, campanulas, etc., are protandrous. (3) When the Fs. are unisexual, as in willow, etc. When pollination has once been effected, the pollen grain germinates on the stigma and sends out a tube which forces its way down the style until it reaches the micropyle of an ovule. The contents of the pollen grain then travel down the tube and fuse with the contents of the ovule. This act of fusion is fertilisation, the most direct result of which is the development of the embryo, and the conversion of ovule into seed. See also BOTANY. See K. T. Hinkson and F. Maitland, *A Book of Flowers*, 1909; W. O. James and A. R. Clapham, *Botany of Flowers*, 1935; W. J. Stokoe, *Observer's Book of British Wild Flowers*, 1937; and M. Hadfield, *Everyman's Wild Flowers and Trees*, 1938; M. C. Carey and Dorothy Fitchew, *Wild Flowers at a Glance*, 1949.

Flower Decoration as we know it now, that is to say, flowers placed in containers filled with water for the decoration of a room, was unknown until the middle of the last century. For hundreds of years people have loved flowers for their beauty and particularly for their perfume, but they scattered them about on the floors of

their rooms, on the tables where their meals were taken, and even on their beds, for the fleeting pleasure which they gave. In mid-Victorian times the arrangement of flowers was as formal as the planning of their gardens; only hothouse flowers were thought good enough for the adornment of the dinner table, and these were festooned across the white damask cloths. Wire was much used then for buttonholes and bouquets to give a stiff effect. It was Queen Alexandra who started a new vogue by having large vases of leaves placed in her drawing-room at Marlborough House, and from that time the use of flowers in the house became gradually more popular and the formality of Victorian days gave place to more natural and artistic arrangements.

At the present time all types of blooms are used—wild flowers, perennials, annuals, branches of flowering shrubs and trees, and even the leaves of certain vegetables. A good effect can be obtained in winter by placing fine twigs in a vase against a light background; in the early spring, too, branches of winter jasmine, forsythia, japonica, etc., and even of non-flowering bushes, can be picked when the buds are just formed, and will soon open out into full bloom in a warm room. The choice of flowers is almost entirely a matter of individual preference, the season, and what one can afford or grow; bunches of mixed flowers of all colours and varieties suit certain types of room, or a mixture of different blossoms in one colour; from the vegetable garden one can take the leaves of curly kale, and carrot tops to use as fern; all white flowers of different types are much more pleasing than would be thought in a vase. The modern method is to strip off the leaves before placing the flowers in the bowl, instead of adding foliage as was a former practice, the idea being that the green detracts from the colour effect of the blossoms. Much of the effect of good flower display depends on the vase or bowl used. The glass and silver specimen vases of the Victorians, together with the brass fern and aspidistra pots, have been replaced by rather large pottery jugs, bowls, and vases. In fact anything can be used to hold flowers if it is watertight and happens to appeal to its owner or harmonise with her room. Glass containers should not be used for thick-stemmed flowers, or where the stem is likely to discolour the water.

The care of the flowers themselves is of importance: those who have gardens should pick the flowers overnight, and place them in a tall jug of water in a cool place. If roses or blossoms with woody stems have been picked, hammer the tips, or slip back the bark and split the stalk. In the case of poppies or hollyhocks the tips of the stalks should be plunged in boiling water to seal them, and they will not drop. Vases need not be emptied every day to snip the stems; instead they may be filled up with slightly warm water; in this way disarrangement of the decorations is avoided. Some types of flowers absorb much water in the first hours, and vases will need refilling. Above all flowers

should be kept away from draughts. Everlasting flowers should be picked when not fully out, and hung in small bunches in a cool, dry place; if the bunches are too thick the flowers in the centre will turn mouldy.

There are various types of supports on the market; many people prefer a heavy glass block; others use a piece of wire netting, loosely rolled and jammed tightly into the bowl; again there is a wire stand, sometimes obtainable, which has looped branches of wire, each of which will hold one blossom; both these and the wire-netting are very economical when flowers have to be bought. Flower-rings, introduced recently, look beautiful when filled with short-stemmed flowers, such as pansies or primroses, or wild roses in summer, and form attractive wreaths of flowers for the table. Wall vases with high flowers are good in a hall. Vases placed in front of a mirror are effective. See Constance Spry, *Flower Decoration*, 1934, and *Flowers in House and Garden*, 1938.

Flower-de-luce, see FLEUR-DE-LIS; IRIS. Flower Gardens have from earliest times been cultivated for pleasure and profit. Especially in the E., where the confinement of a building is so oppressive, we have records of gardens of surpassing beauty. The first mention of them is the description of Solomon's gardens, which were, however, overshadowed by the hanging gardens of Babylon, one of the seven wonders of the world. They were irrigated by water from the Euphrates, and contained a wonderful variety of effects. Persian gardens supplied the type which the Gk. gardeners followed, though the latter introduced glass in the construction of conservatories. To come down to comparatively modern gardens, the Fr. style is one of characteristic elegance. Le Nôtre, a gardener of the seventeenth century, obtained fame in the reign of Louis XIV. by laying out the gardens of Versailles. In 1742 Richard, Viscount Ranelagh, threw open the fine gardens which he had built to his mansion at Ranelagh, and they remained a favourite public resort till 1803. In 1661 Vauxhall Gardens also became famous. Landscape gardening reaches a state of highest perfection in Japan, where they attain the most successful results by following a picturesque irregularity. F. G. have always been a source of pleasure to Eng. people. Bacon's essay 'Of Gardens' is a fine description of one of the Elizabethan period. As in other things garden flowers have their period of popularity and chance for newer varieties, and the foxglove, lavender, marigold, lobelia, calceolaria, and pansy are superseded by geranium, hyacinth, tulip, and chrysanthemum. See also GARDEN ART.

See T. Hammer, *The Garden Book*, 1659; F. Watson, *Flowers and Gardens*, 1901; E. S. Rohde, *Scented Garden*, 1931, and *Gardens of Delight*, 1934; M. Hadfield (ed.), *The Gardener's Companion*, 1936; and S. B. Wootthead, *In Your Flower Garden*, 1948.

Flowering Ferns, see OSMUNDA. Flower Painting. In Europe figure-painting has always been the form of art

most studied, landscape-painting being a later development. Flowers, although used often in a conventionalised form to decorate illuminated MSS. (see ILLUMINATION OF MSS.), did not themselves form the subject of pictures in the earlier centuries of the Christian era. In the seventeenth and eighteenth centuries the Flemish painters developed the art of F. P. to a high degree. Jan Brueghel (1568-1625), the portrait painter, exquisitely reproduced living flowers. Frans Snyder (1579-1657) frequently collaborated with Rubens by supplying the still life in the master's paintings. Fairy-like in his treatment of blossoms was Jan Davidsz van de Heem (1606-83), whose son Cornelis inherited his father's gift to a lesser degree. Daniel Seghers (1590-1661) was, however, the supreme painter of flowers, refusing to blend his subject with any other forms of still life, although he used his floral decorations to embellish his devotional subjects. Among the Fr. artists F. P. became an important study in the nineteenth century, when Edouard Manet (1832-83), Henri Fantin-Latour (1836-1904), and Claude Monet (1840-1926) were regarded as masters of this delicate art. In the E. it has been a cult for many centuries. 'Before a masterpiece of Fantin-Latour we feel that the flowers have been taken from a field or garden to be grouped before us, a feast for the eye,' says Laurence Binyon in *Painting in the Far East*, 'but the Chinese artist brings us to the flower, that we may contemplate it and take from it into our souls something of the beauty of life which neither sows nor spins.' The plum blossom and lotus flower provided a sufficient theme for the oriental artists without need of human figures, and among the most famous flower painters of the Sung period are Hsu Hsi (tenth century), Chao Ch'ang (eleventh century), and Li Ti (twelfth century). See CHINA, *Chinese Art*. See E. Haig, *Floral Symbolism of the Great Masters*, 1916; E. W. Earp, *Flower Painting*, 1928; and I. Nishikawa, *Floral Art in Japan*, 1936.

Flowers, in chem., substances which are sublimated as the result of chemical action. The chief are F. of sulphur, the fine powder which is obtained when crude sulphur is heated to vaporisation and condensed in a cooling chamber; F. of phosphorus, a flocculent powder consisting of phosphorus pentoxide, formed when phosphorus is burned in excess of air or oxygen; F. of tin (*flores stanni*), a mixture of powdered metal and stannic oxide formed by fusing the metal in excess of air; F. of zinc, antimony, arsenic, etc.

Flowers, Artificial, imitations of natural flowers used for various purposes of ornamentation, including millinery, dresses, and decorations in the house. The Fr. make most of these A. F., though some are made in England and other countries. The materials most commonly employed are sarcenet, cambric, velvet, gauze, threads, and wire, and in some cases paper. The petals and sepals are first stamped out and then gauffered, the

same process being pursued with regard to the leaves, which are made of green taffeta, the stems being made of wire. The flowers made for tombs are of pottery or enamelled iron, and sometimes of wax. The Chinese make A. F. from rice-paper, and in the Bahama Is. they are made of shells.

Flowers, Florists', are plants with horticult. varieties, whose parent species are unknown or not cultivated, as the dahlia or gladiolus. Dahlias have only been introduced into England in comparatively modern times, but their beautiful colours, and the fact that they are easily grown and require no especially rich soil, has made them very popular. *Gladiolus*, a genus of the order Iridaceae, bears brilliant flowers, blossoming in mid summer. In America F. P. is the term applied to any flowers raised to be cut for ornamental purposes, as rose, carnation, violet. They are brought to a high state of perfection and elaborate establs. are maintained for their rearing, transportation, and disposal, giving employment to thousands of people, the increase of wealth in the cities being responsible for their demand.

Flower Shows were originated by the Royal Horticultural Society of London, which was founded by Thomas Andrew Knight in 1804 and received its charter in 1808. The object of the society is to encourage and promote the cultivation of plants, flowers, fruits, and vegetables. One of the most valuable means to this end was the estab. of experimental gardens in 1817, which were removed to their present site in Chiswick in 1822. From these gardens plants and seeds were distributed to all parts of the world. At the meetings of the society, members and others exhibited plants, fruits, and flowers, and in time prizes came to be offered for competition. This led to the formal institution of shows in which although called F. S., fruits and vegetables are also exhibited. Fortnightly shows are held throughout the year at the society's hall, Vincent Square, Westminster. The Alpine Garden Society holds three shows in London with special classes for amateurs and novices, and shows at Birmingham and Southport. The National Auricula and Primula Society (S. section) holds an ann. exhibition during April in London; the Cactus and Succulent Society of Great Britain has an ann. two-day summer exhibition in London. The National Chrysanthemum Society, founded in 1846, holds an exhibition in Nov. in London, and the National Dahlia Society one annually in Sept. The Brit. Gladiolus Society promotes an ann. international exhibition, and the National Rose Society has spring, summer, and autumn shows in London, and a prov. show. Other associations which hold ann. shows are the National Carnation and Picotee Society, the Brit. Carnation Society, the Brit. Delphinium Society, the Iris Society, the Rhododendron Association, the National Sweet Pea Society, and the London and S. of England

Viola and Pansy Society. F. S. are also promoted by a number of newspapers. These shows help to make known plants newly introduced into England and those which are the result of cross-fertilisation, hybridisation, etc. Following the foundation of the London Horticultural Society, many other societies came into being, including many local ones in towns and villages. The most important national society of this description is the Royal Caledonian Horticultural Society founded in 1809. Its F. S., which are its chief feature, are held in Edinburgh in April and Sept., and are open to the whole of the United Kingdom and Ireland. See also HORTICULTURAL SOCIETIES. See *Royal Horticultural Society's Gardener's Pocket Diary and Note Book* (ann.).

Flowers, Language of. A special significance is attached to flowers, in that they are used to represent various ideas and sentiments. A consistent and well-understood symbolism has gathered around them, which the orientals especially have developed into a perfect vehicle for communicating expressions of all degrees of warmth. The use of flowers was full of significance among the Greeks and Romans, and the study was revived during the Middle Ages in Europe, when it became especially appropriate in connection with the age of chivalry.

Our own floral symbolism is far more simple and truly poetical than that of the orientals, and we can call to mind what the simplest of our flowers revealed to the eye of Wordsworth.

Certain flowers have a common significance among European nations. Thus the rose is the emblem of beauty; the lily of purity; the violet of modesty; the daisy of innocence; the pansy of thought, and so on; whilst the laurel has long been accepted everywhere as the symbol of glory and the oak of patriotism. Consult John Ingram's *Flora Symbolica*, 1868 (a work which contains also floral poetry, original and selected).

Flowery, see FLEURY.

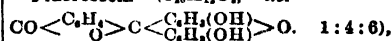
Fludd (Flud, or Floid), Robert (1574-1637), Eng. physician, Rosicrucian and mystic philosopher, of Kent. He entered St. John's College, Oxford, 1591, then spent five years studying on the Continent, taking his medical degree at Oxford, 1605. He was a follower of Paracelsus, and tried to form a philosophic system based on his teachings. F. was author of many obscure Lat. works, theosophical, philosophical, and mathematical. His works include *Apologia Compendiaria Fraternalitatem de Rosea Cruce Affuens* (1616); *Veritatis Proscenium* (a reply to Kepler) (1621); *Philosophia Sacra et Vere Christiana* (1629), *Summum Bonorum* (reply to Mersenne) (1629); *Dr. Fludd's Answer unto M. Foster* . . . (1631); *Integrum Morborum Mysterium* (1631); *Clariss Philosophiæ et Alchymie Fluddianæ* (1633); and *Philosophia Mosaicæ* (1638) (Eng. ed. 1659). See J. Webster, *Displaying of Supposed Witchcraft*, 1677; A. Walte, *The Real History of the Rosicrucians*, 1887; and J. B. Craven, *Doctor Robert Fludd, the English Rosicrucian*, 1902.

Flügel, Otto (1842-1914), Ger. philosopher; b. at Lützen; son of the burgomaster. Pastor, 1871. Co-editor, *Zeitschrift für exakte Philosophie im Sinne des neueren philosophischen Realismus Philosophie*, from 1873; of *Zeitschrift für Philosophie und Pädagogik*, from 1894. After Kehrbach's death continued issue of Herbart's works. Wrote *Der Materialismus* (1865); *Die Probleme der Philosophie und ihre Lösungen* (1876, 1906); *Die Seelenfrage* (1878, 1902); *Das Ich und die sittlichen Ideen im Leben der Völker* (1885); *Die Bedeutung der Metaphysik Herbaris für die Gegenwart* (1902); and *Herbaris Leben und Lehre* (1907).

Fluid, name given generally to substances devoid of rigidity. Gases and liquids are included in the term, since these bodies offer no sensible resistance to change of form, though they resist compression. Thus when a F. is acted upon by any distorting combination of forces it *flows*. Hydrodynamics is the name of the branch of applied mathematics which deals with the motion and equilibrium of Fs. The word fluid is figuratively applied to things which are not in reality such. For example, we speak of electric F. in the sense of electricity, whose general properties and motions are known to conform to certain differential equations which the motions and properties of true Fs. strongly suggest. The best writers, however, avoid this figurative use of the word as far as possible nowadays, for it dates from the time when electricity, magnetism, etc., were actually believed to be due to Fs., which were supposed to have a real objective existence. All Fs. are elastic, but liquids are highly incompressible, whereas gases can easily be compressed. There is more or less frictional resistance to the molecular motions in every F. It is somewhat difficult to draw a sharp distinction between the solid and the liquid state. A great deal depends upon external circumstances, such as the intensity of gravity and temp. Some substances, when exposed to long continued gentle stress, flow like visco-liquids, whereas they would splinter if subjected to sudden intense stress.

Fluke, see LIVER-FLUKE; TREMATODES. **Fluoboric Acid Gas**, pungent, soluble gas obtained by heating a mixture of boron trioxide and fluorspar with concentrated sulphuric acid. It does not attack glass, but has a great affinity for water and rapidly chars many organic substances. It combines readily with ammonia gas, forming various compounds according to the relative proportions of the two gases.

Fluorescein ($C_{20}H_{12}O_{11}$), i.e.



a chemical product or dye obtained by heating phthalic anhydride with resorcin at 200° till the mass becomes viscid. It is a reddish or yellow-brown powder, dissolving in water or an alkali to form a solution with a beautiful green fluorescence. It is little used itself for dyeing

purposes, as the colours are not fast, but eosins are derived from it, and rival safflower and saffronin for rose-red dyes. See PHTHALIC ACID.

Fluorescence, optical property possessed by certain substances whereby light of one colour is absorbed and light of another colour is emitted. When light falls on sulphate of quinine, for example, the liquid exhibits a bluish colour, which is continued some distance below the surface. The light which passes through the liquid is incapable of producing the same effect on another quantity of the substance, so that it appears that light of certain qualities has been absorbed to produce the F. The phenomenon was first described by Sir D. Brewster in 1833, was investigated by Sir John Herschel, and later by Sir G. G. Stokes. If a beam of sunlight is focused on a solution of quinine sulphate by means of a lens of long focus, a blue cone of light is formed and can be plainly followed by the eye through the liquid, though the intensity of the light rapidly diminishes as it recedes from the surface. In order to discover what rays are responsible for the blue light, a test-tube containing quinine sulphate may be passed through the different parts of the spectrum. No change is observed when the tube is held in the red, orange, and yellow, that is, in the less refrangible rays, but as it approaches the violet, rays of a blue colour proceed, and this continues beyond the visible spectrum into the ultra-violet rays. The general effect then is that light waves of short-wave length are absorbed and waves of longer wave length are emitted. Among fluorescent substances may be mentioned fluorspar, chlorophyll, aesculin, uranium glass, tincture of turmeric, paraffin oil, barium platino-cyanide, magnesium platino-cyanide, fluorescein, and various sulphides. The phenomenon of 'F.' is now put to use in electric discharge lamps. The electric current in the discharge tube produces ultra-violet radiation and when this falls on a coating of a fluorescent material deposited on the wall of the tube light of the visible spectrum is emitted. See Sir G. G. Stokes, *Mathematical and Physical Papers* (vols. iii. and iv.), 1880-1905; R. W. Wood, *Physical Optics*, 1914; and J. A. Radley and J. Grant, *Fluorescent Analysis in Ultra-Violet Light*, 1933.

Fluoric Acid, see HYDROFLUORIC ACID.

Fluorine, chemical element of the halogen group, atomic weight 19, atomic number 9. It is an extremely active gas, combining readily with most chemical elements. It was isolated in 1886 by Moissan, who obtained it by electrolysis of liquid hydrofluoric acid free from water. As hydrofluoric acid is itself a non-conductor of electricity, the addition of a quantity of potassium hydrogen fluoride was necessary to convey the current. The electrolysis was carried out in a U-tube made of an alloy of iridium and platinum, this substance being less readily acted upon than other metals. The electrodes were made of the same material, and the products of electrolysis

were carried off by lateral tubes, the entrances to the U-tube being stoppered with fluorspar. As an additional precaution a temp. of -23°C . was maintained during the operation, this being done by surrounding the tubes by the vapour from boiling methyl chloride. The object of this cooling is to condense any hydrofluoric acid gas present. F. is now prepared on a large scale by the electrolysis of fused potassium hydrogen fluoride in an electrically heated copper V-tube with graphite electrodes. F. is a pale yellow gas with an irritating smell. It condenses at -187°C . to a yellow liquid, and forms a light yellow solid at -233°C ., whilst at -252°C . it becomes white. It is the most active element known, decomposing water readily, and liberating appreciable quantities of ozone. It combines violently with non-metals such as bromine, iodine, carbon, sulphur, silicon, phosphorus, arsenic, etc., frequently causing them to burn with incandescence; it readily attacks mercury, sodium, potassium, magnesium, and other metals, and is only unaffected by oxygen, nitrogen, and chlorine. Curiously enough the gas can be kept over mercury if it is not shaken, but this is due to the formation of a layer of fluoride which protects the metal from further attack. The only compound of F. with hydrogen is *hydrofluoric acid*, prepared commercially by heating fluorspar with sulphuric acid in leaden vessels. It is a colourless liquid boiling at 19°C .; its vapour is extremely poisonous, and it combines readily with many metals, forming fluorides. Its most useful property is that demonstrated by its action on glass; it attacks the silica, and may thus be used for etching glass. When the materials are dry, no action takes place. F. is found in nature in fluorspar (CaF_2), cryolite and other minerals, and traces are found in sea-water and in the enamel of teeth. Various compounds of F. have recently become of considerable industrial importance, and many of them are of high significance in atomic energy operations.

Fluorspar, or **Fluorite**, mineral mainly consisting of calcium fluoride (CaF_2). It occurs crystallised in the cubic system and in the massive form. The crystals have a perfect cleavage, a hardness of 4, sp. gr. 3.2, and occur in a wide range of colours from transparent to almost black. It often contains calcium chloride and traces of organic matter. Many crystals contain an internal cavity, which is found to contain liquid or gas. The colour, too, is attributed to organic matter, as when the mineral is heated the colour tends to disappear and small quantities of carbon monoxide, hydrogen, etc., are evolved. Some varieties exhibit the phenomenon of fluorescence (q.v.), and phosphorescence is observed when the mineral is submitted to Röntgen rays. F. occurs in association with ores of tin, lead, copper, and silver, and also in cavities in volcanic rocks. It is of wide distribution, and is common in England, particularly in Cornwall, Devon, Derbyshire, and Cumberland. In mining dists. F. is used as a flux for copper, lead,

and gold ores. The violet variety, known as 'Blue John' in Derbyshire, is made into ornaments. The mineral was highly prized by the ancients for this purpose, but the spar is too soft for personal ornaments. F. is the chief source in the manuf. of commercial hydrofluoric acid, used for etching glass. The transparent variety is used in the construction of optical instruments.

Flushing (Dutch, *Vlissingen*), fortress and seaport in the prov. of Zeeland, Netherlands, on the S. coast of the is. of Walcheren, at the mouth of the W. Scheldt. It was once an important naval station, but is now a leading port of commerce, carrying on, in normal times, an extensive trade with England, Java, and S. America. The tn. has grown in favour as a summer resort. It has a royal dockyard, and since 1875 a large floating dock. The chief industries are shipbuilding, brewing, and the manuf. of oil and soap. Exports agric. produce and shrimps. In the Second World War the greater part of F. was captured on Nov. 1, 1944, by a strong force of Brit. commandos who were landed on Walcheren. Canadians stormed the causeway from the mainland. On Nov. 3 F. was entirely in Brit. hands. Pop. 23,000. See also WESTLAN FRONT IN SECOND WORLD WAR.

Flushing and Flushing Bay, once a vil. of Queens co., New York, U.S.A., but since 1897 has been part of the bor. of Queens, New York city. It is situated on Long Is., at the head of F. B., and is named after early nonconformist settlers from F. in Holland.

Flute, musical wind instrument consisting of a long tube of wood or sometimes metal, in sev. detachable joints and open at the lower end. The vibration of the air in the tube is caused by blowing into the upper end through an oval-shaped hole in the side. The different intervals in the pitch are obtained by closing or opening the different finger-holes in the lower part of the tube, by which the vibrating column of air is lengthened or shortened as desired. The F. in general use possesses a workable compass of about three octaves from the low C in the treble clef with all the chromatic intervals. There are six finger-holes in the lower part of the tube arranged at fixed intervals from each other in order to produce all the notes which form a major scale; the second octave is obtained by blowing with increased force which raises each note to an octave higher, and the third octave can be added by a system of cross-fingering. When chromatic intervals are desired the instrument must have additional finger-holes which are manipulated by means of keys. *Oculus-wood* is the material from which the majority of Fs. are constructed; but gold, silver, and other metals are sometimes used. Ebonite also is used. The F. has been in use from the earliest times. Olympus the Phrygian has been credited with the introduction of F.-playing into Greece, where it was largely used in religious ceremonies and encouraged by means of competitive trials

of skill. The old Eng. F., called the *flûte à bec*, from its supposed resemblance to the beak of a bird, was played from the upper end of the tube, had seven finger-holes and was made in various sizes, called treble, tenor, alto, and bass Fs. respectively. The 'German' F. (*flauto traverso*) gradually superseded the *flûte à bec* from its invention about 1720. Handel was one of the earliest composers to introduce the 'German' F. into the orchestra, employing it for some of the solos in *The Ode on St. Cecilia's Day* (1739). The F. of Handel's day, however, owing to the arrangement of the finger-holes and the difficulty of manipulating the fingering, could only be played in tune in certain keys; this difficulty was abolished by Boehm about 1834, when he introduced the cylindrical bore and a new system of fingering in place of the old conical bore. Boehm's instrument is in tune in practically all keys and is now the one generally used. F. solos are less common than they were formerly, but the instrument still plays an important part in orchestras, where the F. part is generally placed at the top and is written in the violin or G clef. Other varieties of the F. are the flûte, simply an octave F. in B₃, much used in military bands; the *flageolet*, a smaller variety of the old *flûte à bec*; the piccolo, an octave F.; and the 'flûte d'amour', a minor third below the ordinary F. The old varieties of the cornet (usually classed in a family of its own, with the serpent and key bugle and the pilgrim's staff are now obsolete. The old recorder is now in use again (see RECORDER). Among the foundation stops of most organs there are generally one or more 'F.' stops. See also FIFE, FLAGEOLET, PICCOLO. See R. S. Rockstro, *Construction, History, and Practice of the Flute*, 1890; and P. Wetzzer, *Die Flöte*, 1906.

Flute-stop, organ stop of the diapason species and so called because its tone resembles closely that of a flute. The bell diapason, as it is often called in Britain, is the *flûte à pavillon*, a stop of Fr. invention, and is characterised by its peculiarly powerful tone.

Fluting, in architecture, the channel mouldings cut vertically on the surface of the shaft of a column. In Doric columns the flutes round the shaft are twenty in number and meet with a sharp edge. They are carried up above the necking and end abruptly at the base of the cap. In the other orders the flutes are twenty-four in number, and are



MODERN
CONCERT
FLUTE

separated one from the other by small fillets. The flutes each terminate in a semicircle at top and bottom. Sometimes, in order to strengthen the columns, the flutes are cabled, that is to say, they are filled in with a bead for about a third of the length of the shaft from the base. In Romanesque architecture many decorated Fs. appear, in which the flutes are curved, zigzag, or wreathed.

Flux (from Lat. *fluere*, to flow), substance used to aid in separating metals from the other constituents of their ores. The action may be either the removal of silica or other earthy matter by promoting fusion, or actual combination with the oxygen, sulphur, etc., in the compound from which the pure metal is to be extracted. Black F. is a reducing F., that is, it extracts oxygen from the ore. It consists of a mixture of finely divided carbon and potassium carbonate, and is made by heating crude cream of tartar with about half its weight of nitre. White F. is a mixture of carbonates of soda and potash. Other fluxes are lime, borax, silica, calcium sulphate, fluorspar, and red lead.

Fluxions, method of mathematical computation devised by Sir Isaac Newton. The method was used by Newton for some time before he disclosed its principles to the world in 1693. For some years the system was used by Eng. mathematicians, but was gradually abandoned in favour of Leibnitz's notation. Leibnitz looked upon quantities as made up of very small parts, as the circumference of a circle may be represented as a polygon of an infinite number of sides. Newton, on the other hand, represented such a line as the effect of the continuous motion of a point the velocity of which in equal intervals of time measures the magnitude of the quantity. The method of F. was fully treated in the *Treatise on Fluxions* of Colin Maclaurin, pub. in 1742.

Fly, see DIPTERA; HOUSE FLY.

Fly, Artificial, see ANGLING.

Fly-blister, see CANTHARIDÆ.

Fly-catcher, name of a Passerine family of Muscipidæ, but it is used in a wider sense generally to describe all birds who catch flies on the wing. There are over 40 genera and 280 species. The Fs. are small-sized, bright-plumaged birds, and abound in warmer parts of the old world and in Australia. They are not found at all in N. and S. America. The bill is a distinctive feature; it is strong and short, and has bristles on the broad, flat base. The common Brit. F., *Muscicapa grisola*, is a tiny brownish-grey bird. The pied F. (*Muscicapilla atricapilla*) is a native of Great Britain, rare in the S., not uncommon in the N. The beautiful paradise F. of the E. Indies and the 'grinder' F. of Australia do not belong to the family Muscipidæ.

Fly-fishing is the sport of catching fish by use of an artificial fly as bait. It is rightly considered to be the most fascinating branch of angling, and great ingenuity has been bestowed upon the manu. of the various flies used for the purpose. Not only has the angler to

choose a fly closely resembling in colour and shape the flies dancing over the stream at the time, but he must also cast the bait in such a way as to preserve the appearance of life. F. is principally used for the salmon, trout, and grayling. Sometimes three or four flies are cast together upon the water and drawn below the surface somewhat at random, while another method is to select a particular fish and cast a fly a short distance up-stream, allowing it to float down over the fish's head. The sport requires considerable dexterity and has innumerable devotees. See bibliography for ANGLING.

Flying, or **Flight**, the act of moving through the air by propulsion given by wings. In the strict sense of the term the power of flight is only possessed by certain insects, birds, and bats, the latter including the so-called F.-fox. There are other animals which modify their progression through the air by various means which give their actions a certain similarity to actual flight, and they are therefore loosely termed F. animals. It is uncertain to what extent the extinct reptiles (pterodactyls, pterosaurs, rhamphorhynchus) were actually capable of F., but they certainly possessed wings very similar to those of the bat. The so-called F.-fish (q.v.) give themselves an initial impulse by means of a powerful spring effected by their muscular tails; and use their pectoral fins after the manner of a parachute, being thereby able to sustain themselves for some hundreds of feet in the air. The action of the fin, however, can hardly be said to be analogous to that of the wing in birds. Certain species of lizards, as, for example, the *Draco volans*, have a skin formation attached to their ribs, which are peculiarly elongated. In such a way as to form a kind of kite, and this enables them to make short darts through the air. The F.-opossums or F.-phalangiers, a genus of small arboreal marsupials found in Australia, have a fold of skin along the flanks which, serving as a parachute, allows them to make prolonged leaps with considerable agility and grace. A smaller member of the same species is known as the F.-mouse. There are also two genera of squirrels (*Pteromys* and *Sciuropterus*) which have a development of the skin between the fore and hind legs and possess the power of making leaps for great distances through the air. In doing so they also make use of their tail, the hairs of which stand out on either side and serve to some extent as feathers for supporting them, while the tail also aids to direct their flight. The parachute action exhibited by the animals mentioned above is developed to a greater extent in the F.-lemur (*Galeopithecus*), an insectivorous animal in whom the hairy fold of the skin reaches from the throat to the end of the tail and includes the whole length of both fore and hind legs up to the claws. These animals can leap a distance of over 200 ft., and are found in the Indian archipelago. Zoologically it is difficult to say whether the F.-lemurs should be classed with lemurs, bats, or insectivores, but the latter is the usual method of

classification adopted. There is also a kind of squid or cuttlefish known as the F.-squid, having broad lateral fins, which enable it to spring high out of the water. See also BAT; BIRD; DRAGON; FLYING-FISH; INSECT; OPOSSUM; PTERODACTYL; SQUIRREL. For F. machines see articles on AERONAUTICS; AEROPLANE. See J. B. Pettigrew, *Animal Locomotion*, 1882; Strasser, *Über den Flug der Vögel*, 1885; Maybridge, *Animal Locomotion*, 1887; and for the flight of birds F. W. Headley, *Structure and Life of Birds*, 1895.

Flying Boat, type of aircraft designed for landing on water, in which the body itself serves as a boat, and is not supported by floats, as in the case of a *seaplane*. Used in the empire air-mail services.

Flying Bomb, pilotless jet-propelled aircraft used by the Gers. as a long-range bombardment weapon against London and other targets, both in England and on the Continent, in 1944. Its speed was between 350 and 400 m.p.h., the weight of explosives about one ton, and the range approximately 150 m. During the eighty days of the most intense bombardment of London between June and Aug. 1944 some 2300 of 8000 F. Bs. launched reached the London area. Of the bombs launched some 25 per cent were erratic, many diving into the sea. A few strayed as far as Norfolk and Northampton. The remainder were brought down by the combined efforts of anti-aircraft guns, fighter pilots, and barrage balloons. In the first week of the bombardment 33 per cent were brought down, while rather more than that reached London. By the end of the eighty days 70 per cent were being brought down by the defences, and only 9 per cent reached London. In the ensuing months F. Bs. were launched pickaback from Heinkel planes over the North Sea, but the number that reached England was negligible. In the intense period the record destruction of F. Bs. was on Aug. 28, when out of 101 which approached the Eng. coast ninety-seven were brought down by the defences. But for the timely discovery of the Ger. intention to use the weapon as a means of cowing the people of London much greater damage would have been wrought. In April 1943, however, reports from secret agents suggested that the Gers. were developing a long-range bombardment weapon of a novel type. Reconnaissance aircraft obtained photographs in May showing that at Peenemünde on the Baltic coast there was a large experimental station where jet-propelled F. Bs. for launching from inclined ramps fitted with rails were being tried out. Later it was seen that the Gers. were building all along the Fr. coast, from Cherbourg to Calais, a series of concrete structures similar to those seen on the Baltic coast and all the Fr. sites were seen to be oriented in the direction of London. These ramps or sites were repeatedly and successfully bombed, and then in March 1944 the Gers. began constructing an entirely new series of firing points, much more speedily constructed, and so camouflaged as to make detection almost impossible until they had actually

fired. By this time, however, the detailed arrangements for defence were being rapidly completed. The Ger. attack started a few days after the allied landings in Normandy (June). An awkward problem was that of seeing the F. B. at all. Pilots on patrol had the greatest difficulty in spotting so small and fast-moving an object sev. thousand feet below, though over land help was rendered by radio telephone. In darkness, however, it was easy to spot the flaming tail of the F. B. many miles away, but in order to bring down the bomb the pilot had to fire his guns at a range of 300 yds. If he fired when too far away he would probably miss the bomb; if he fired when he was too near the bomb might blow up and destroy the pilot. Meanwhile Prof. Sir Thomas Merton produced a simple and ingenious range-finder, which proved to be the complete solution for this difficulty. In July 1944 a light-scale attack was made on Portsmouth and Southampton, but most of the F. Bs. fell in the sea or in open country, showing that the weapon was not accurate enough against targets of that size, and during the rest of the summer the attack was directed indiscriminately at the unique target of London, and about 92 per cent of all the fatal casualties occurred in the London region. In the summer Brit. and Amer. Air Forces dropped over 100,000 tons of bombs on the F. B. sites. In these operations these forces lost nearly 450 aircraft, involving a loss of 2900 pilots and aircrew—figures which afford an indication of the seriousness of the threat. Large stores of F. Bs. were located in tunnels and caves near Paris, and many of these were discovered and destroyed. A train loaded with 200 F. Bs. was detected about this time, and information was passed back to England in time for Brit. bombers to fly out and blow up the train before it could move on. There is no doubt that but for timely interference the bombardment would have started early in 1944 at a time which would have seriously affected the efficiency of the defences. The only completely effective answer was to capture the sites, especially those in the Pas de Calais. The successful allied invasion achieved that purpose though the previous destruction of the first 100 launching sites not only delayed the bombardment, but also forced the Gers. for the sake of concealment to construct their second series of sites on simpler and less efficient lines. It may be added that during 1944 some 24,000 houses in London were destroyed and 800,000 more or less badly damaged. F. Bs. and rockets were also fired by the Gers. at Antwerp and Liège in Belgium between Oct. 13, 1944, and the end of March 1945. Antwerp in particular was subjected to incessant attacks, which caused much loss of life and damage, but this did not interfere with the working of the port and the moving of military supplies, an essential prelude to the supplying of the allied armies during the winter, and their spring campaign, which finally resulted in victory in May 1945.

Flying Bridge, see FERRY.

Flying Dragon, or Draco, genus of lizards, belonging to the family Agamidae. The species are brilliantly coloured and are unable to change their hues; in habit they are entirely terrestrial, and in diet insectivorous; their harmlessness makes



FLYING DRAGON

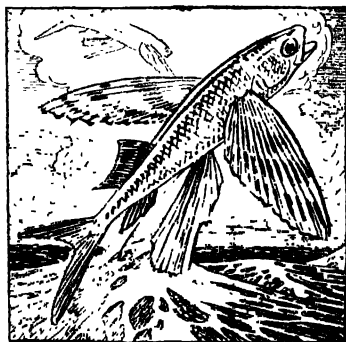
them suitable for pets. Their great peculiarity lies in the wing-like membranes, which extend from their sides, can be opened and shut at their owners' will, and serve as a parachute when they leap from one branch to another. *D. volans*, a Malayan lizard, is the best-known species; in length it is about 5 in., with another 5 in. for the long, thin tail.

'Flying Dutchman,' name given to a spectre ship, supposed by popular belief to haunt the waters round the Cape of Good Hope. According to the legend, the captain of the vessel, Vanderdecken, was condemned for his blasphemy to sail for ever round the cape in a special ship, always unable to 'make' a port. Sailors consider the appearance of the *Flying Dutchman* a bad omen and quickly change their course to avoid it. The legend has sev. variants in many tales of Ger. mythology, and its prototype is likewise current in other countries. According to Sir Walter Scott, the vessel was originally laden with bullion, a murder was committed on board, and plague broke out. Wagner's opera, *Der fliegende Holländer*, is based on this legend.

Flying-fish are of two species, the *Ereocetus* and the *Dactylopterus*. They are bony, and can travel some distance in the air above the water. Of the *Ereocetus*, or flying herring, there are forty known species, mostly in warmer seas. A few are seen in Brit. waters and in the Mediterranean. The long pectoral fins are the distinguishing feature. The length of the body is about 1 ft.

Flying Fortress, four-engined heavy Amer. Boeing B17 bomber used with considerable effect in daylight raids on Germany in the Second World War. These machines fought their way to

targets far inside Germany, with or without fighter escort, in the face of the most intensive fighter opposition. Their success was due to the type of guns carried and their location on the machine, and to the type of formation assumed and maintained throughout a raid. The weapon employed was the .50 machine gun firing 54-in.-long bullets at muzzle velocity of 2800 ft. per sec. The ammunition was usually loaded in sequence of five rounds, one tracer, two incendiary, and two armour-piercing. The gun's rate of fire averaged about 650 rounds a min. A force of 250 B17s carried over 3000 machine guns—a most formidable array. This heavy armament would have been less effective in combat had the Amers. not developed and adapted a formation pattern that ensured a complete screen of fire for each aircraft. Any blind spot of one F. F. was checked and covered by the gunners of one or more accompanying F. Fs. The aircraft were stacked up in tiers, and flew in close formation so that the guns in the nose and tail, the ball turret, the waist guns, and those in the other positions had full play. The skill required from the pilots and crews of the F. F. was of the highest degree, retention of individual positions over a period of sev. hours being essential. The total crew of a F. F. was ten. Often the losses on a raid were remarkably small. Thus only five were lost on a 1000-bomber and fighter raid on Wilhelmshaven, but sixty were lost in a raid on Schweinfurt (Oct. 14, 1943), there being no fighter escort. Subsequently the U.S. Army Air Force sent long-range Thunderbolts in large numbers to escort the forts all the way to their objective, and in a raid in Nov. 1943 on Düren, near Cologne, not a single F. F.



FLYING-FISH (*Ereocetus Volitans*)

was lost. Again, on July 24, 1943, in an attack on the Ger.-controlled magnesium and aluminium plant in Heroya, in Norway, only one B17 was lost—forced down over Sweden without loss of the crew. At Stuttgart (Sept. 6, 1943) forty-five were lost out of 338 B17s, but eighty-four enemy aircraft were destroyed. If

the losses over Schweinfurt were heavy, all five of the works at that place were almost completely wiped out.

An improved model, the B50, is known as the superfortress. It is made by the Boeing Airplane Company at Seattle, is powered with four Pratt & Whitney 3500-h.p. engines, and can climb to 40,000 ft. Its bomb capacity is stated to be 10 tons, and its maximum range without refuelling 6000 m. However, in 1940 one of these aircraft flew non-stop round the world, 23,000 m., in 94 hrs. 1 min., at an average speed of 239 m.p.h. It refuelled four times from tanker aircraft whilst in flight.

Flying-fox, see FRUIT-BAT.

Flying-lemur, insectivorous mammal with a parachute provided with special muscles, very efficient for flying. It can sweep for a distance of 70 yds. The claws are for climbing, and the colour is that of mottled bark. It is about 20 in. long, and inhabits the Indian archipelago.

Flying Machines, see AERODYNAMICS; AERONAUTICS; AEROPLANE.

Flying-squirrel, member of the squirrel group of rodent animals, having a parachute-like expansion of the skin of the flanks, partly supported by bony processes of the feet, which enable it to take extraordinary leaps, gliding for a great distance through the air. There are two widely distributed genera, the *Pteromys*, including the larger, and the *Sauromys*, the smaller species. The former are characteristic of the Indian and E. Indian region, the latter of N. America, Asia, and Europe. The European species is about the size of a rat, of a greyish-ash colour, with a short tail, and it lives in the forests. Its fur is of little value. The N. Amer. species, on the contrary, is a good deal larger, and its tail is as long as its whole body. In general appearance F. Ss. resemble ordinary ones, and their habits, food, etc., are much the same. They are rarely seen except at night.

Fly River, New Guinea, rising in the N.W. corner of the Brit. part of the is., and flowing into the gulf of Papua by a wide delta. MacFarlane and D'Albertis ascended it 90 m. in 1875, and in 1885 Capt. Everill explored it for 200 m. Its banks are densely wooded.

Flysch, remarkably thick mass of sandstones and shales extending very continuously from the S. Alps to the Vienna basin, and then round the Carpathians into the Balkan peninsula. Although uniform in character, it is not of the same age in every place, and probably extends from the Lower Cretaceous period to the Tertiary. It consists in all probability of debris washed down the sides of the hills over a long period. Nowhere are fossils abundant except in the Oligocene bed of Glarus. Similar formations to the F. are found in the Pyrenees, the Apennines, the Caucasus, and in the Siwalik beds of the Himalayas. According to locality the F. is variously known as Vienna sandstone, Carpathian sandstone, Macigno, Red F., Wild F., etc.

Fly-trap, see *DIONÆA MUSCIPULA*.

Fly-wheel, wheel of large diameter and heavy rim connected with the driving-

shaft of an engine in order to equalise the motion. Where the motion of an engine proceeds from the to and fro movement of a piston-rod impelled by the expansive power of steam, it is evident that the velocity decreases towards the end of the stroke when the piston and crank are approaching the same straight line. The moving parts of the engine thus tend to proceed in jerks. The function of a F. is to receive the excess of energy when the impulse is great, thus retarding the motion of the engine, and to aid the engine when the impulse is less than the mean. In other words, by virtue of its turning-power when in motion, it acts as a reservoir of energy by which intermittent impulses are made uniform, or by which intermittent demands on the energy may be spread over a longer period. It is thus used in two sets of circumstances: (1) When the engine is moved by force applied in successive strokes, as in a single acting steam engine, a gas engine, a treadle lathe, etc.; (2) when the work which the engine is called upon to perform consists of intermittent strokes, as in punching machines, etc. For effective working the F. should be placed near the seat of intermittent motion; thus, a punching machine driven by gas should have a F. on the crank-shaft to regularise the motion of the gas engine, and another on the punching mechanism to store the energy to be given out in successive punches.

F.O.B., abbreviation for 'free on board,' used in contracts for the sale of goods to denote that costs of carriage and delivery of the goods on board ship must be paid by the seller.

Foch, **Ferdinand** (1851-1929). Fr. general, b. at Tarbes and of old Pyrenean descent. Educated at Metz, and was here when the Franco-Prussian war broke out, and during that war was posted to an infantry regiment. Entered the artillery school, and passed out with distinction as a gunner officer. He was a lieutenant in 1875, and captain in 1878, after a course at the École Polytechnique, Paris. In 1885 he entered the staff college, and in 1895 became instructor in military history, strategy, and applied tactics at the college. His lectures, which are republished in his *Principles of War* (1903, 1918), were at once recognised as being of sterling merit in their earnest and profound analysis of the elements and conditions that had brought success to the Ger. arms in 1870-1871, and success to Fr. arms in the forty years prior to the battle of Waterloo. He was known before the First World War as author of a number of standard books on tactics and strategy. He was promoted lieutenant-colonel in 1898, colonel in 1903, and general commanding 13th Infantry Div. in 1907. In the First World War he served on the W. front, becoming a marshal of France in 1918, and generalissimo of the whole of the Brit., Fr., and Amer. forces in France and Flanders. From the very first days of the campaign F., who in 1914 was a corps commander, established his reputation as one of the most brilliant of the allied leaders, and it is perhaps not a little surprising that his wonderful

achievement at the head of the Ninth Army in the fighting in the St. Gond Marshes in the 1914 battle of the Marne was not at once productive of a more dramatic promotion. At the Marne battle he played a most prominent part in arresting the onward rush of the Ger. armies and saving the cap. from the invader. He was in command of the Fr. centre between Sézanne and Mailly, and for three days he was compelled, against the repeated efforts of the Gers. to pierce his line, to retire. Yet promptly in the succeeding days he renewed the offensive with a stubbornness which was characteristic of his whole nature, and at last, having drawn the enemy ever further into the marshes, he took him in flank and



Lupical Press

MARSHAL FOCH

buried him back over the riv. He again signally distinguished himself in 1915 during the first battle of Ypres, his aid being invoked by F.-M. Sir John French (later Earl Ypres) when the Gers. launched their first gas attack. In the great Somme offensive begun by the Brit. in the middle of 1916 the co-operation of the Fr. armies was under the direction of Gen. Foch. Finally in the darkest days of 1918, when it became apparent to every one that the success of the enemy armies in Europe generally was largely due to unity of command among Ger. headquarters, it was agreed by the Allies to co-ordinate the action of the allied armies on the W. front under Gen. F. The decision was taken in April 1918, and from the turning point of the last Ger. rush, namely in the middle of July at the second battle of the Marne, the Fr. marshal, by a series of remarkable actions along the entire front, gradually 'rolled up' the Ger. armies, and forced them to sue for an armistice.

As a mark of appreciation Marshal F. was made a field marshal of Great Britain and awarded the Order of Merit. His chief publs. are *The Principles of War* and *The Conduct of War* (1904). In these it is clear that his model is Napoleon, and that

after earnest and searching examination he rejected the Ger., and particularly von Moltke's, system in principle and endeavoured to restore principles which were more in keeping with the genius and traditions not only of the Fr. Army, but of the Fr. nation as a whole. The strategy of F. inspires confidence from the fact that his own guiding maxim is that 'to hold positions is to prepare implicitly for defeat, if nothing further is attempted, if the offensive is not immediately assumed,' a lesson which his fellow countrymen completely ignored later when they reposed entire confidence in the Maginot line. In his professional capacity at the Ecole Supérieure de la Guerre F. was before 1914 a master of the science of war. His success was therefore the practical application of sound principles of strategy combined with an absolute mastery of technique. After the Armistice F. engaged in a strenuous but fruitless struggle for a military frontier on the Rhine, though he never advocated a political annexation of the Rhineland and the Palatinate. He took his case to all the authorities—the president (Clemenceau), who favoured it, but thought the constitution was against it; the Council of Four, the Fr. Cabinet, and the plenary conference of the Allies. He was defeated all along the line in this political campaign, which opened a breach between himself and his old friend and ally, Clemenceau, which was never to be closed. Physically Marshal F. was a man of middle height, with deep bass voice, grey-blue eyes, and typical Fr. military moustache. He was a man of few words, and when speaking in public was precise and logical, staccato in utterance, and essentially mathematical in expression and point of view. See *The Memoirs of Marshal Foch*, trans. by T. B. Mott, 1931, and M. Weygand, *Foch*, 1947.

Fochabers, vil. of Morayshire, Scotland, situated on a height overlooking the R. Spey, 8 m. S.E. of Elgin. Gordon Castle is near by, and in the vil. is a handsome public educational building which was erected by Alexander Mylne, who was a native of the par. Pop. 1000.

Focsani, or Fokshani, tn. of Rumania and cap. of the dist. of Putna. It is situated on the Milcov, 125 m. N.E. of Bucharest, and it is an important commercial centre, having a riv. trade with Galatz. Before the Second World War there were soap and oil factories, tanning works, and a trade in wine and grain. The Turks were defeated here in 1789 by the Austrian and Russian allies. Pop. 32,000.

Focus (from Lat. *focus*, a hearth), point to which converging rays are directed or from which rays diverge. When rays of sunlight, which may be taken as parallel, are received upon a concave mirror, they are all reflected to a certain small area in which any object will appear to be intensely illuminated; the geometrical point corresponding to that area is called the F. of the mirror. If light is received upon a convex mirror the reflected rays are scattered, but their direction may be followed backwards to a point behind the

mirror, which is therefore called the "virtual" F. When parallel rays are made to converge by means of a lens, the point where they meet is called the F. of the lens, and it is at this point, or near it, that sun's rays may be made to ignite paper, wood, etc. In geometry a F. is a point which has some definite relationship to the points on a continuous curve. Thus the F. of a parabola is a point the same distance from a point on the curve as the latter is from a fixed straight line. An ellipse is a curve whose distance from a fixed point called the F. bears a constant ratio, less than unity, to its distance from a fixed straight line. There are two such foci, except in the case of a circle, where the centre is the F. In estimating the propagation of earthquake shocks, the F. is that point from which the earth-waves diverge in all directions; frequently there are two such foci.

Fodder, see FATTENING FOODS.

Foerster, Wilhelm (b. 1869), Ger. philosopher and educationist. Prof. of pedagogy, Munich Univ., 1914-20. Resigned on account of his pacifist opinions. Went to Zürich, and after the Bavarian revolution became Bavarian minister in Switzerland. Notable as an advocate of education based on the spirit of positive Catholic Christianity, and as an opponent of Ger. militarism. Owing to his opposition to Ger. official policy he was exiled (1933), and now lives in America.

Fœtus, embryo in its later stages of development, when it is recognisable as belonging to the species of its parents. In the first week of fertilisation the human ovum passes into the cavity of the uterus, in two weeks it is about $\frac{1}{4}$ in. long and $\frac{1}{4}$ in. broad, and the folds which ultimately determine the head and the caudal region are developed. By the fourth week the embryo is curved upon itself, the rudiments of the ear appear as small nodules, and oval buds indicate the coming of limbs. The eye is recognisable in the fifth week, and the main segments of the limbs are defined. At eight weeks the F. has a distinctly human appearance, the nose is prominent, the fingers are separate, and the tail becomes reduced to a rudiment; the length of the F., excluding the legs, which are small and curved inwards, is about $\frac{1}{4}$ in. In the third month the limbs assume more definite proportions, nails appear on the fingers and toes, and sex can be distinguished. In the fourth month hairs are developed, and the hind limbs gain in proportion to the fore limbs; the F. is from 6 to 8 in. long, and may live for a few hours if b. at this time. In the sixth month the length has increased to about 12 in.; eyelashes and eyebrows appear. In the seventh month the body is plumper, the eyelids open, and the F. is capable of living if b. In the eighth and ninth months the body increases in size and plumpness, the colour takes on a rosy flesh tint. At the end of the ninth month, when the F. is b., it should measure about 20 in. in length, and should weigh from 6 $\frac{1}{2}$ to 7 $\frac{1}{2}$ lb. In its fetal stage the embryo is of course dependent upon the maternal blood supply for nutriment. The organ

of nutrition is the placenta, in which an interchange of products of the maternal and fetal circulation takes place. The connection between the F. and the placenta is the umbilical cord, which after birth becomes atrophied. *See also* EMBRYOLOGY.

Fog, or **Mist**, condition of the atmosphere produced in sev. different ways. It is due to the condensation of aqueous vapour which is always present in the air and begins to condense when the point of saturation is arrived at. Such a point is reached sooner in air at a low than at a high temp., hence Fs. are often produced by the sudden cooling of air, owing to its meeting another current at a lower temp. For the same reason morning mists disappear as the sun's heat increases. Vapour is more readily condensed if there be something which affords a nucleus for such condensation, so that the presence of dust particles is sufficient to produce F., even in non-saturated atmospheres. The density of the F. or mist produced depends upon the amount of aqueous vapour in the atmosphere, the temp. and pressure, and the number and size of dust particles. A cloud is simply a mist formed high up above the earth's surface. If the drops of condensed vapour are sufficiently large they fall as rain.

The drops of water in a F. are extremely small, one thousandth ($\cdot 001$) of an inch or less in diameter. A drop of $\cdot 001$ of an inch in diameter falls through the air at about 200 ft. per hour. A F. of drops of this size would soon clear, if it were not renewed, as the height of Fs. is generally less than 1000 ft. But Fs. are renewed by cooling at their upper surface and by evaporation from the ground; frequently, too, there are many smaller drops which fall more slowly; a drop half the size (diameter) falls at one quarter of the speed. The thick, opaque Fs. prevalent in large cities, and especially in London, are due to the large number of carbon particles floating in the air. A F. will arise where a warm, damp current of air passes over a cold surface. This phenomenon is particularly to be noticed in the region of ice floes. The Fs. on the coasts of Nova Scotia and Newfoundland are due to the warm air from the Gulf Stream passing over the colder water from the Arctic Ocean. On the other hand, mists frequently arise from the contrary cause of cold air passing over warm water. Thus at eventide, or when a sudden fall of temp. sets in, the air cools more quickly than the water, and cannot absorb the vapour given off by the latter, leading to the production of mists so often seen over sheets of water or marshy ground. In London Fs. frequently occur during the winter months, beginning usually in Sept. and reaching their greatest frequency in Nov., whence they gradually decline until the middle of Feb., after which a greater falling off takes place, the least foggy month being July. Fs. usually occur on a calm day or when there is a light E. wind blowing. The record of London Fs. kept since 1863 shows that the worst F. was that of 1879, which lasted practically

from the beginning of Nov. to the following Feb., Dec. having no fewer than seventeen foggy days. In the year 1873 no fewer than seventy-four Fs. were recorded. The presence or absence of F. has a great effect upon the death-rate, sufferers from asthma, bronchitis, pneumonia, pleurisy, and other diseases of the lungs, as well as whooping cough, being especially affected thereby. Dense Fs. in great cities are of considerable inconvenience owing to the general or partial suspension of traffic caused, and they are the chief obstacle to safe air travel. Fs. are classified by the meteorological authorities, with the concurrence of the aviation and shipping authorities, according to the distance at which objects can be seen in daylight—a distance called the visibility. In a dense F. visibility is less than 55 yds.; this may seem too great an allowance, but the classification is based primarily on the needs of planes and ships, and for these a F. is prohibitively dense if the visibility is less than 55 yds. A thick F. is one with a visibility between 55 and 220 yds, while a moderate F. is one with a visibility between 550 and 1100 yds. The distances of visibility of lights at night are adjusted to ensure uniformity of classification; an ordinary street lamp would be visible at 100 yds. in a F. in which the daylight visibility was only 50 yds. See also FOG SIGNALS. See C. J. Cave, *Clouds and Weather Phenomena*, 1926; D. Brunt, *Meteorology*, 1928; and H. H. Clayton, *Atmosphere and the Sun*, 1930.

Fogazzaro, Antonio (1842-1911), poet, novelist, and distinguished Liberal Catholic, b. at Vicenza; studied literature and divinity under the Abate Zanella, and law and music at Padua and Turin. With his Wordsworthian simplicity and pathos he was the purest modern It. writer. He first pub. a poetic romance, *Miranda* (1874), followed by *Falsolda* (1876), which brought him a modest recognition as a poet. Turning to fiction he produced *Malombra* (1881) and *Cortis* (1887), both unworthy of his genius. His next novel, *Misterio del Poeta* (1888), a unique and beautiful idyl, was his first great success; and this was succeeded by the trilogy *Piccolo Mondo Antico* (1896); *Piccolo Mondo Moderno* (1901); and *Il Santo* (1905), to which was ultimately added *Lella* (1910). F.'s fame rests chiefly on *Il Santo*, wherein is expressed the culmination of his theological sympathies with the young Christian democrats and the broad principles of modernism. This work, trans. into sev. languages as soon as it appeared, and placed on the index, caused a greater stir than any other modern European novel save, perhaps, L. N. Tolstoy's *War and Peace*. See lives by E. Donadoni, 1913, 1939; G. Vitelli, 1934; and L. Portier, 1938.

Fogelberg, Benedict Erland (1786-1854), Swedish sculptor, b. at Gothenburg. His father was a copper-founder. Studied under Pierre Guerin, the sculptor, and Bosio. In 1820 he fulfilled the dream of his life, and went to live and work in Rome. He was recalled to his native country by royal command in 1854, but

returned to Trieste in the same year, and d. there suddenly. His works display independence of thought and wonderful imagination influenced by anc. Gk. art. His statues of Odin, Thor, and Balder at the National Museum at Stockholm, completed in 1845, are strong and beautiful expressions of his art. His portraits of Gustavus Adolphus, 1840, Charles XII., 1851; and of Bjarne Jarl, the founder of Stockholm, 1855, are full of life and vigour. See life by J. Böttiger, 1880.

Foggia, tn. of Apulia, Italy, and the cap. of the prov. of F. It is situated in a fertile dist., 76 m. N.W. of Bari. The cathedral, dating from 1172, was partially destroyed by an earthquake in 1731 and rebuilt in a different style, though some Norman work still remains. It is on the main line from Bologna and Brindisi, and is an important centre for the market produce of the surrounding dist. The prov. has an area of 2688 sq. m. The tn. was badly damaged in the Second World War in 1943. The modern part of the cathedral roof was damaged and the arch of Frederick II was demolished. The tn. fell to the Allies on Feb. 27, 1943. Pop. (tn.) 57,200, (prov.) 62,300.

Foghorn, see FOG SIGNALS.

Fogo, one of the Cape Verde Is. It is the highest in the group and has an active volcano, reaching 8800 ft. above the sea. The climate is good, though tornadoes sometimes sweep across its borders. The area is 170 sq. m. São Filipe is the chief tn. Total pop. 20,900.

Fog Signals are audible signals used on board ship, on railways, or elsewhere, at times when lights or ordinary signals would be of no avail. The maritime code, first made in 1861, and revised in 1897, is now universal. According to this code steam vessels under way are to sound a prolonged blast every 2 min. upon a steam whistle or siren; if under way, but stationary, two prolonged blasts at the same interval. A sailing vessel under way must sound a foghorn, giving one blast every 2 min. if on starboard tack, two blasts if on port tack, and three blasts when sailing before the wind. When at anchor each vessel is required to ring a bell at intervals of not more than 2 min. F. S. are given on railways by laying small detonating caps upon the lines, which explode as the front wheels of the engine pass over them.

Föhn (Lat. *favonius*), warm, dry wind blowing down the valleys of the Alps from high central regions, generally in the winter months. It is caused by the expansion of air in the mts., cooling and thus condensing the vapour, which as it descends to lower levels is dynamically heated, causing warmth and dryness. The F. wind often blows with great violence, and causes much discomfort and strain on the nervous system. Similar local winds occur in many parts of the world, on the W. coast of Greenland, in the Rocky Mts., Colorado, and New Zealand. This wind is often known as the sirocco in the S. Alps, though its nature and cause are not the same as the true sirocco wind. See Buchanan, *Atmosphere*

Temperature during Föhn, and E. Walter, *Der Schweizerföhn*.

Föhr, one of the N. Frisian is. in the North Sea, off the W. coast of Schleswig-Holstein. Wild fowl abound in the autumn, oysters are exported to Hamburg, and fishing is largely carried on. Wyk is the chief tn. Area 30 sq. m. Pop. 7000.

Foil, general name for thin plates or sheets of metal, resembling a leaf in thinness. It is used in chem. for electrical apparatus, and by jewellers for backing gems of the less precious kind. The latter is sometimes known as Dutch F., consisting of small sheets of silvered copper, rolled very thin. It is coated with a mixture of isinglass and translucent colour, highly polished. Tinfoil is the commonest kind, formerly used for wrapping chocolate, tobacco, etc. Gold-F. is chiefly used by dentists for filling teeth, and is thicker in substance than gold-leaf, which is employed principally for gilding purposes. Gold-leaf is prepared by a prolonged beating-out of the metal between sheets of vellum and thick skin. The leaves can be produced in ten different shades of colour, according to the amount of silver or copper alloy used, and are about 3½ in. square.

Foil, see under FENCING.

Foix, title of a distinguished old Fr. family, which was famous from the eleventh to the sixteenth centuries, resident in the tn. of F. Count Roger, grandson of the count of Carcassonne (d. 1012), was the first to assume the title of count of F. He d. about 1064. His brother Peter succeeded him, followed by his son Roger II., who distinguished himself in the crusade of 1095; this count was excommunicated by the pope for seizing Church property. In 1190 Count Raymond Roger fought in Palestine, and assisted in the capture of Acre; afterwards he fought in the wars of the Albigenses. His estates were seized by the Church on the excuse of heresy and given to Simon de Montfort. He regained them before he d. by large bribes to the Church. His grandson, Roger Bernard III., was a better poet than a warrior; he was first made a prisoner by Philip III. of France and then by Peter III. of Aragon; he married the daughter of the vicomte de Béarn. His great-grandson, Gaston III., was the most famous member of the family (see below). Gaston IV. (d. 1479) married Leonora, daughter of King John of Aragon and Navarre. His grandson, Francis Phoebus (d. 1483), became king of Navarre. His sister Catherine succeeded him (d. 1517), having married Jean d'Albret (d. 1516). When Henry of Navarre became king (1589), the estates of F. became part of the royal domain of France. Another grandson of Gaston IV. was Gaston de F. (d. 1512), a distinguished soldier; his sister Germaine became the second wife of Ferdinand I., king of Spain. Gaston took the command of the Fr. troops in Italy, and d. at Ravenna.

Foix, Gaston (Phoebus) III. de, Comte de, and Vicomte de Béarn (1331-91), son of Gaston II. He was surnamed Phoebus,

because of his great personal beauty; he also bore a golden sun in his escutcheon on account of this name. He fought for France against England and defended the frontiers of Gascony, but being displeased at King John II.'s preference for the count of Armagnac he left the Fr. Army and went to fight in Prussia. Returning to France in 1358 he rescued the royal princesses from the Jacquerie at Meaux, and at once began war against the count of Armagnac, whom he defeated and compelled to pay a large ransom. He was appointed governor of Languedoc, and when Charles VI. became king he was recalled, the duke of Berry being chosen as governor. Gaston, however, refused to give up Languedoc, and fought for two years, retiring defeated to his own estates. He married Agnes, daughter of Philip, count of Evreux, and Queen Jeanne II. of Navarre; he divorced her in 1373. Their only child, Gaston, tried to poison his father, and it is probable that his father killed him in 1381. Gaston on his death left his estates to Charles VI. Froissart writes a vivid description of the splendour of Gaston's court, of his delight in beauty, and his love of hunting, and asserts 'that there was none like him, of so fair a form or so well made.'

Foix, cap. of Ariège dept., France, on R. Ariège, at the foot of the Pyrenees, 44 m. S. of Toulouse. It is faced on the W. by a cavernous rock, with three Gothic towers and the ruins of an old castle. Gaston de Foix was b. here (1489). There are iron and steel works, bauxite mines, and flour mills. Pop. 6000; arron. 46,800.

Fokien, see FUKKIN.

Fokine, Michel (1880-1942), Russian dancer and choreographer, b. in St. Petersburg. Began his training under Mme Kursavina's father at the old Imperial School of Ballet. His versatility soon marked him out as an altogether exceptional dancer, and thus early he suggested reforms of the conventional ballet which has now become familiar. F. was responsible for the choreography of *Les Sylphides*, *Le Pavillon d'Armide*, and of the *Prince Igor* dances. Other triumphs of his art were *L'Oiseau de feu* and *Schéherazade*, but perhaps his supreme masterpiece was *Petrouchka*. F.'s choreography showed a keen sensibility to musical style, besides a mastery of romance and the dramatic motif through expressive action, mime, and gesture. As a reformer of the dance he ranks with Noverre and, in co-operation with Diaghilev, he raised the status of the ballet among the arts. See C. W. Beaumont, *M. Fokine and his Ballets*, 1935.

Fokker, Anton Hermann Gerard (1890-1940), Dutch aeroplane builder, b. at Kediri, Java. Educated at Haarlem. Became an aviator at the age of twenty. International pilot in 1911; in 1912 competed successfully in Russia—also erected a factory at Johannesthal, Berlin; in 1913 opened another at Schwerin. During the First World War he kept the Gers. supplied with fighting aircraft—his biplanes and triplanes being named after him.

The Ger. general staff valued his services so highly that he was naturalised by military decree, but in 1919 he liquidated his Ger. affairs and opened business in Holland. In 1924 he became a director of an Amer. aeroplane company. Inventor of the means of shooting through the field of a tractor-propeller. This invention, however, was really only a development of a Fr. idea—that of the great Fr. pilot, Garros. The machine with perhaps the greatest flying record was the Fokker F-7, used by Kingsford-Smith among others; it was a three-engined monoplane, and in 1928 was flown over all the great oceans and across the Amer. continent.

Fokshani, see FOCSANI.

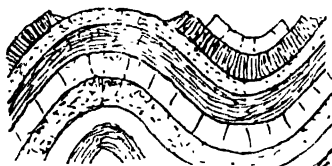
Folard, Jean Charles, Chevalier de (1669-1752), Fr. officer and tactician, served at the battles of Cassano (1705) and Malplaquet (1709). His writings include *Nouvelles Découvertes sur la guerre* (1724); *Commentaires sur Polybe*, 1727-30 (1753); *Traité des colonnes et de l'ordre profond* (1727-30). Napoleon later adopted this column formation recommended by F. See *Mémoires pour servir à l'histoire de la vie de Folard*, 1753, and *Esprit du Chevalier de Folard*, 1761, pub. by Frederick II.

Foleland, see BOC-LAND.

Folemate, see FOLKMOOT.

Fole-right, or Folkright, body of customs recognised as law in early Eng. hist. before the Norman Conquest. The term later became synonymous with common law. See F. W. Maitland, *History of English Law*, 1899, and H. M. Chadwick, *Studies in Anglo-Saxon Institutions*, 1905.

Fold, in geology, a bending or curve in stratified rocks. Curvature of some degree occurs in most strata, but the term is particularly applied to a somewhat sudden inclination to the general direction.



OPEN SYMMETRICAL FOLD

An anticline or upward bend and a syncline or downward bend

Where the strata continue their original direction on a higher level after a single bend, the F. is termed monoclinic; if more often occurs that the strata are doubly bent upwards or downwards, when the Fs. are called anticlinal or synclinal.

Folengo, Teofilo (1491-1544), It. Macaronic poet, b. at Cipada near Mantua. He is also known as Merlino Cocciajo, a name under which he wrote. He became a Benedictine monk, but in 1516 he seems to have grown tired of the monastery, and we find him wandering about the country in company with a lady named Girolama Deda. His first pub. was a romance in

verse entitled *Merlino Cocciajo macaronicon*; this proved a success and was followed by *Orlandino*, which he pub. under the name of Limerio Pitocco (Merlin the Beggar) da Mantova. This was in 1526, and he seems then to have tired of his wandering and returned to his monastery, where he wrote an account of his roamings entitled *Chaos del tri per uno*, part prose, part verse, and in a mixture of Lat. and It. He wrote a life of Christ, *L'Umanità del Figliuolo di Dio*, and many other poems that were not pub. Rabelais quotes and even copies him; the early eds. of his *Opus macaronicum* are very rare.

Foley, John Henry (1818-74), Irish sculptor, was b. in Dublin. His first exhibits were his models of 'The Death of Abel' and 'Innocence' in 1839; both these were well received, but his 'Ino and Bacchus' (1840) created even a greater stir. It was executed in marble for the earl of Ellesmere. Some more of his works are 'The Death of Lear' (1841); 'Prospero and Miranda' (1843); 'Contemplation' (1845); 'The Mourner' (1849); and 'Caractacus' (1867). All his works were of a very high order, but his statues and busts were especially noted. His bronze equestrian statue of Lord Hardinge, now in front of the gov. house, Calcutta, is one of the finest works produced in this country. He also executed the statues of Goldsmith and Burke in Trinity College, Dublin, and a symbolical group, 'Asia,' and a statue of the Prince Consort for the Albert Memorial in Hyde Park. His portrait busts are noted for their excellent likenesses.

Folgoré, Giuseppe, It. poet, one of numerous writers of sonnets in the thirteenth century. His poems vary very much in their degrees of excellence, but are all more or less humorous and satirical, and typical of the time at which they were written. Rossetti trans. them into Eng., and there are also trans. by J. A. Symonds. See D. G. Rossetti, *Dante and his Circle*, 1874; and J. A. Symonds, *Italian Literature*, 1881.

Foliation, in geology, a structure characteristic of the gneisses. The different minerals appear in the rock in layers, not continuous, but usually lenticular in form, that is, the bands of quartz or felspar increase in thickness to a maximum and then taper out, while other layers widen out. These bands are very often curved and tortuous; if the lenticular structure is visible to the naked eye, the rock is called a gneiss, if much finer grained it is usually termed a schist. When a gneiss has large elliptical folia of felspar, it is said to be an Augen gneiss, from the Ger. *Augen*, eyes. F. must be distinguished from the lamination of sedimentary or metamorphosed rocks, which may either be due to the fact of their having been deposited in layers, or, as in slate, to great pressure exerted through the folding of strata.

Foligno, or Fuligno (anc. Fulgintia), tn. of Perugia prov., Umbria, central Italy, 20 m. from Perugia, is situated on the Topino. It is noted for parchment, silks, leather, soap, woollens, and machinery. The earthquakes of 1831-32 did much damage. The cathedral of San Feliciano

is the chief public building. F. was once head of a confederacy of Umbrian cities. It is now a bishop's see. F. was one of the most damaged tns. in Umbria in the Second World War, scattered bombs falling over all the centre of the tn. The Gers. made elaborate plans to blow up the cathedral and the municipal offices, but did not have time to accomplish their purpose. The cathedral sustained damage though the fine façade of the N. transept was unharmed. The church of St. Augustine was destroyed,*except for the façade. The oratory of the Annunziata was ruined and with it Perugino's 'Baptism of Christ.' Pop. 13,000.

Folio (ablative of *folium*, leaf, or often an adaptation of it. *foglio*), with reference to pagination, a leaf of paper or parchment of a MS. or book, numbered only on the front, measuring about 17 by 22 in. In bibliography and printing the phrase 'in folio' is used of a sheet folded once to make two leaves, and hence of a book formed of such sheets, a book of the largest size. In book-keeping a F. is the page or two pages (numbered aliko) in a ledger on which the creditor and debtor account is entered.

Folk Dancing. The simple, spontaneous and uninstructed dances of people in small tns. and country places. The word folk means the common people, and such phrases as folk-lands, folk-lore and F. D. are related to the rights, the customs, the habits and life of the ordinary pop. In every country of the world dancing has played its part, and practically everywhere is susceptible of a rough div. into two main parts: formal and spontaneous. In its more stately and intentional manner dancing has been surrounded with rigid rules, precise etiquette or social custom, from auct. times when it was part of religious ritual, to the later day of pomp in court balls. In its simpler aspect it has been part of the play of the children in the street and a natural outlet of the spirits of adult merry-makers on the vil. green. Dancing is now influenced by professionalism and the habit of the professional mind is to adopt the convenient plan of limiting its definition to a specific style. In the strict language of the dancing instructor, F. D. is not quite the same as country dancing, but in a looser and more general use of words the two phrases are interchangeable. In England the Eng. Folk Dance and Song Society leads a vigorous movement to keep alive and revive popular interest in F. D., which except in the N. had virtually died out late in the nineteenth century. Cecil Sharp, a devoted pioneer, worked hard to preserve folk music and F. D. before it became extinct. The Brit. Gov. gives a grant to assist the organisation of the pastime on the ground that F. D. is a traditional and inexpensive means of keeping the people cheerful and healthy. See J. Black, *Folk Dances of Europe*, 1910, and D. Kennedy, *England's Dances: Folk Dancing To-day and Yesterday*, 1948.

Folk High Schools. Dan. organisation for adult education, particularly intended

to provide a general humanistic education. Inaugurated in 1944, they number fifty-seven, with an attendance of over 6800 pupils, aged eighteen, residing for periods of from three to five months, at a monthly cost of from £4 to £5. Though subsidised by the State, a great freedom is allowed to the teaching staff, and the students, who attend voluntarily, are not faced with examinations, marks are not given, and everything is done to encourage the free pursuit of general culture, in subjects such as hist., civics, art, philosophy, religion, and politics. Independent work is an important part of the system, and centres on well-stocked libraries. The school at Askov (where the library numbers 50,000 vols.) is the largest, and is an 'extended' school in that opportunity is given for students to continue their education through two or three winter terms. The Home Mission and other religious sects have their special high schools. The work of the whole organisation is of the highest value in preventing young adults becoming absorbed in one profession or business to the exclusion of all other forms of cultural experience.

Folklore, science of the elucidation of the peasant and local elements in modern culture. In the customs and traditions of the peasant class in all countries are embedded the knowledge of past events which hist. ignores, and religious and legal observances, the significance of which has long been forgotten. Those fragmentary survivals of a savage past are to be found in such apparently meaningless quantities as game rhymes, nursery rhymes and tales, ballads and marches, vil. ann. observances, and old saws. These survivals of an older culture remain among the non-progressive portion of the pop., and their analysis and elucidation constitute the science of F.

The logical and inductive treatment of traditions respecting persons and places often results in the elucidation of scientifically proved facts which throw considerable light upon the dark places of hist. Thus the children's rhyme 'London Bridge is broken down,' when taken into conjunction with sundry Eng., Breton, and Norse folk-tales, reveals first the intense interest and wonder of the Britons of the Rom. period in the architectural work of an alien and superior culture, and secondly illustrates the fact that London Bridge was captured by King Olaf the Dane in the tenth century. Thus we discover the true attitude of the auct. Britons to their Rom. conquerors, and can gauge the importance of a strife that was sufficiently stubborn to merit chronicling not only in the pages of the *Heimskringla*, but in the more lasting song-treasury of youth.

The little that can be gleaned concerning some characters known to be historical may be supplemented by F., as in the case of Hereward the Wake, Rob Roy, and Wm. Tell, tales regarding whom are prevalent in the dists. where they dwelt. But in such cases the wonder element is mingled with fact, and discrimination is necessary to arrive at sound conclusions.

The testimony of F. as regards anct. religious practice is chiefly afforded by old vil. or civic observances, customs in connection with calendric or seasonal changes or 'sacred' wells. For example, the tn. of Hawick, in the Scottish border country, possesses an anct. civic rhyme sung annually at the riding of the tn. marches, which commences 'Teribus and Teri Odin.' This in A.-S. is 'Tyr habbe us, ye Tyr, ye Odin,' or 'Uphold us, Tyr; uphold us, Odin,' so that the lay, sung with such fervour by the loyal lieges on all high occasions, civic and political, is undoubtedly a fragment of an invocation to the N. war-god Tyr and the All-Father Odin. Such an example shows not only what the anct. religion of the townsfolk of this border burgh was, but also proves them to have sprung from a race of Teutonic origin, so that such a fragment of song is as full of proof as any historical document.

Again in many parts of Great Britain and Ireland 'sacred' wells are found, the bushes surrounding which are covered with rags. In pagan times these springs were regarded as the haunt of some minor deity or spirit to whom sacrifice of some description was periodically rendered. The rags surrounding these shrines are still offered up by the country folk, and the practice is strikingly illustrative of the substitution of the part for the whole, which follows the breakdown of the practice of human sacrifice, the rag representing a part of the person who makes the sacrifice. Fragments of worship of the rain-god are often retained in connection with well worship, as in the isle of Gigha, off the coast of Scotland, when the water of a sacred well is blown to the four quarters of the heavens when rain is desired.

The legal aspect of F. is important. Starting from the premises that most of the anct. legal codes of people in a barbarian condition are in verse of an alliterative form, we can see how many rhymes employed by the peasant class are fragments of anct. law. Thus the Scottish children's rhyme, 'Tappie, tappie touseie, will ye be my man?' probably typifies the surrender of a freeman to an overlord. The rhyme gathers greater significance when we learn that the speaker seizes by the forehead the child to whom he addresses the words. Countless gifts of land are still commemorated in doggerel, and it is significant that until a late date in Eng. law it was admitted as a principle that if oral declarations conflicted with written instruments the former had the more binding authority. The marriage service of the Church of England exhibits marked signs of having been originally composed in verse.

Many folk-tales describe a constitution of society which is plainly barbarous. Implicit in them are vestiges of marriage by capture, the law of mother-right or descent from the female side, totemism, fetishism, and witchcraft or shamanism. In elucidating these—as indeed all F. problems—the anthropological method, or argument by analogy from the habits and

customs of existing savage races, is insisted upon by folklorists in contradistinction to the mythological method, or elucidation by reference to natural phenomena. Where the folklorist sees only the record of some prehistoric custom or event, and the mythologist espies the hist. of a sun-god, the impartial observer may discover traces of both, or neither. But there are many cases in which both methods may be singly employed. Thus by the anthropological we find in old tales the savage elements which prove their vast antiquity, to which has been superadded during the centuries a certain amount of the matter of modern culture. We find, for example, queens who wear their crowns, yet open the door to callers, talking animals, a childlike belief in magic—all the simplicity and credulity of the barbarian condition.

Turning from folk-tale to folk custom pure and simple, the exact description of which is dubious, and which may or may not refer to religion, law, or hist., we have such phenomena as 'sin-eating,' in which a paid person undertakes to devour the sins of the dead before burial through the medium of bread and salt, 'in order that the deceased may not walk.' This practice, accompanied in some dists. by incantations, appears a relic of ceremonial cannibalism, by which the relatives of the deceased secured themselves from being haunted by the dead man by devouring him. Such too are the Irish customs of placing a dead person's hand in the milk-pail in order that the milk may increase in richness, the taking of mould from graveyards for medicinal purposes, and so forth. Lastly differences in race may be traced to many folk customs; thus the daubing of the bridegroom's feet with soot in N.E. Scotland, the painting of the Southam 'Godiva,' the slaughter of the ram lamb at Holme, are all probably remnants of non-Aryan culture. The race has become absorbed, but its customs remain in a more or less fragmentary condition.

See W. Henderson, *Notes on Folklore of the Northern Counties of England and the Border*, 1879; Sir G. L. Gomme, *Folklore Relics of Early Village Life*, 1883, *Ethnology in Folklore*, 1892, and *Folklore as an Historical Science*, 1908; Sir J. Rhys, *Celtic Folklore*, 1901; J. A. MacCulloch, *Childhood of Fiction*, 1905; E. Hall, *Folk Lore of the British Isles*, 1928; F. van der Leyen, *Volkstum und Dichtung*, 1933; Christina Hole, *Wonder Tales of the British Empire*, 1934, *Folk Tales of Many Nations*, 1936, and *English Folk Heroes*, 1948; and Sir G. W. Cox, *Tales of Gods and Heroes*, 1940.

Folkmoor, Folkmote, or Folcmote (folk-meeting; A.-S. *gemot*, mot assembly), name for the popular national assembly which met for political and judicial purposes or for deliberation in A.-S. times. The Gers. and Scandinavians had similar assemblies in olden times. At first the meetings were held in the open air on the moot-hill, and all the freemen in the shire attended, but later only the head of each family was admitted, and the meeting was held in the moot-hall. The people were summoned

by means of 'The Axe and the Arrow,' 'The Flery Cross' (described in Scott's *Lady of the Lake*), 'The Wardstaff of the Ongar Hundred,' 'The Dumb Borsholder,' etc.; and the officers of the court were the *burlieman*, who acted in the capacity of judge; the *raatmen*, or councillors; and the *stallere*, who was the superintendent of the court.

Folk-music, traditional melodies, the spontaneous expression of national temperament in popular times, and essentially an art of the peasantry. Nearly every race has its own folk-songs and dances; in primitive races they are almost invariably associated with religious rites. European F. is, of course, the finest, and the nationality of the chief types can be readily identified. Celtic, Ger., and Slavonic races have the strongest predilection for self-expression in folk-songs, and many of their examples are of rare beauty. F. is very strongly rhythmic, and of the most simple and regular construction. Sev. of the great composers have collected and transcribed folk-tunes, e.g. Brahms's *Hungarian Dances*, Liszt's *Hungarian Rhapsodies*, Dvořák's *Slavonic Dances*, etc.; whilst nearly all composers have used them, more or less, in their works, notably Haydn (Hungarian), Mendelssohn (Ger. and Scottish), Grieg (Scandinavian), Tchaikovsky, Glinka, and Borodin (Russian), etc. Even Negro tunes have been used, chiefly by Coleridge-Taylor, who embodied both Amer. plantation songs and African Negro chants in sev. of his compositions; and Dvořák, who used plantation songs in his New World symphony and the Op. 96 String Quartet (known as the 'Nigger' quartet). Much attention has recently been devoted to the collection and study of Brit. F., notably by Cecil Sharp (*Folk-Songs of England*), Mrs. Kennedy-Fraser (*Songs of the Hebrides*), and Rutland Boughton (in various writings on musical æsthetics); and the settings of Irish folk-tunes by Percy Grainger, the celebrated pianist, are well known. See MUSIC, SONG, etc.

Folkright, see FOLK-RIGHT.

Folkstone, municipal bor., seaport, and mkt. tn. in Kent, about 6 m. N.W. of Dover and 72 m. from London. It has a deep-sea harbour, which was begun in 1881. The shipping entering and leaving was over 800,000 tons before the Second World War. The tn. lies in a hollow between two high cliffs on the Eng. Channel, and is a fashionable resort. It is opposite Boulogne, and is a gateway to the Continent. Its harbour admits vessels of from 10 to 12 ft. draught at high water. The old pier was widened and lengthened in 1901. The Leas, on the top of cliffs 100 ft. high, form a tableland of lawns, in all 2 m. in length. The Leas Cliff Hall is a prominent feature of the Leas; it is built into the face of the cliff with a roof promenade on a level with the Leas, and is largely used for concerts and for conferences. At the foot of the cliffs is a pastoral walk known as the Under-cliff. On the E. side of the tn. lies the B. Cliff, an area which in recent years has been much developed. Beyond this lies

the Warren, an area of undisturbed natural beauty. Among other parks, grounds, and open spaces are Radnor Park; the sports ground on the Cheriton Road, with a co. cricket ground; and the Westenhanger race course (about 5 m. from the tn.), at which six meetings are held each year. Other places of entertainment are the Pleasure Gardens Theatre and the Marine Gardens Pavilion, a large building near the harbour and owned and controlled by the corporation. F.'s anct. par. church, dedicated to Sts. Mary and Eanswythe, stands on a site that in the early days of Christianity in these lands was occupied by a priory. It has long since disappeared, as also has the first nunnery in England which stood close to it, founded by St. Eanswythe, daughter of the king of Northumbria, to whom sev. miracles are ascribed. The church dates back to the twelfth century, and is a building of much historical and archaeological interest, not the least important feature of it being a very fine stained-glass window, the cost of which was met by the medical men of Great Britain in commemoration of F.'s distinguished son, Wm. Harvey, discoverer of the circulation of the blood. The free grammar school was founded in 1674. There is a fine central library on Grace Hill, and a new branch library was opened at Cheriton in 1938. The art gallery and museum occupy the upper floors at the central library. The tn. was frequently raided by enemy aircraft in the Second World War, but a progressive policy of rehabilitation has largely restored the tn.'s many amenities. Pop. (1931) 37,571; (1945) 27,000.

Follette, Robert Marion La, see LA FOLLETTE.

Follicle, in anatomy, a small tubular gland. A dental F. is a sac enveloping the developing tooth; a Graafian F., one of the small vesicles in the ovary, each containing an ovum; sebaceous Fs., the glands of the skin which secrete sebum; hair Fs., the sacs enclosing the roots of the hair.

Folquet de Marseille (1150-1231), troubadour of It. race. In 1198, being weary of love and having taken holy orders, he became abbot of Le Toronet in Provence. Here he joined Simon de Montfort and disgraced himself by his fanatical rage against the Albigenses, persecuting and slaying, until his victims, according to the story, numbered 500,000 persons. For this extraordinary zeal he was canonised by the church. He d. in the abbey of Grandseigne, and was given a place in paradise by Dante. His many poems have not yet been trans. into Eng.

Folticeni, see FALTICENI.

Fomentation (from Lat. *foreo*, I warm), method of applying warmth to some part of the body, but very often the term is used to signify the substances used. Fs. are used to remove pain, and a simple one is made by dipping flannel into very hot water, boiling if possible, and wringing it out in a towel. This should be applied immediately and covered with wool and waterproof sheeting to prevent the escape

of the heat. As soon as this becomes cool it should be replaced by another flannel. Very often boracic powder is dissolved in the hot water, and turpentine, camomile, opium, or belladonna is sprinkled on the flannel, especially when the pain is very great. *Fs.* are very efficacious in cases of pleurisy and colic, or for any pains in the chest or stomach, and very often a serious illness is ward off by prompt application of them.

Fomorians, anct. race of gods in Irish Gaelic tradition, related to the pre-Celtic race known in Irish story as Fírbalgs. But, whereas the Celts regarded them as baneful, they were generally regarded as peaceful agric. deities. The most prominent was Balor of the Evil Eye.

Fonblanque, Albany William (1793-1872), Eng. journalist, descended from an old Huguenot family of Languedoc. In 1828 he became editor of the *Examiner*, which he controlled for seventeen years (1830-47) with the utmost success. The paper, under the management of Leigh Hunt, had already a high reputation, but under the direction of *F.* it reached its zenith. He pub. a collection of his articles under the title of *England under Seven Administrations* (1837). See E. B. Fonblanque, *Life and Labours of Albany Fonblanque*, 1874.

Fond du Lac, city of Wisconsin, U.S.A., situated at the head of Lake Winnebago, 60 m. N.W. of Milwaukee. It lies among the hills, and is the cap. of Fond du Lac co. The first settlers arrived on the site about 1834, and it was chartered as a city in 1852. It possesses artesian wells and has a considerable lumber trade. Pop. 27,200.

Fondi (anct. Fundi), tn. of Caserta prov., Campania, Italy, 13 m. from Gaeta, on the Applan Way. Close by is a salt lagoon (*L. Fundanus*). There are remains of a Gothic cathedral (with eleventh-century mosaics), a Dominican convent where Thomas Aquinas taught, and the castle of the Colonnas. The anct. Cæcubus Ager near by was very fertile and noted for wines. The whole of the tn. was severely damaged by bombing in 1943. The monumental churches damaged were San Pietro, largely destroyed, San Francesco, half the cloister gone, Santa Maria Assunta, and San Domenico; also the castle was half destroyed. Pop. about 12,000.

Fonsagrada (Holy Well), com. and tn. of Lugo prov., Galicia, Spain, 76 m. E.N.E. of Santiago, with flour mills. Pop. about 17,000.

Fonseca, Manoel Deodoro da (1827-92), first president of the United States of Brazil, b. at Alagoas. He entered the army, and took part in the wars against Montevideo (1864) and Paraguay. On May 14, 1887, he issued a manifesto defending the political rights of military officers, and won over the entire army. When Correa d'Oliveira became Conservative Prime Minister he gave *F.* a command; six months later the ministry was overthrown, and soon after *F.* returned and was persuaded to head an insurrection; the result was a bloodless victory

and the proclaiming of a republic, of which he became president (Feb. 1891). In the following Nov. he retired from public life.

Fonseca, Marchessa de (*née* Eleonora Timentel) (c. 1768-99), gifted It. lady, studied under Spallanzani, married (1784) to the marquis of *F.* Introduced to the court of Ferdinand IV., she became for a short time maid of honour to his queen, Marie Carolina. In 1789 she espoused the cause of the Fr. Revolution. Her salon at Naples was the headquarters of opposition to the court, and she founded and ed. the *Monitore Napoletano* during the ascendancy of the popular party in Naples (1798-99). On the restoration of Ferdinand she was executed.

Fonseca, Gulf of (Amapala Gulf or Bay of Conchagua), large gulf of the Pacific, bordered by Salvador, Honduras, and Nicaragua, in W. Central America, discovered 1522-23, and named after the bishop of Burgos. The volcanoes Conchagua and Coseguina are on either side of the entrance (about 21 m. apart).

Fons Sanus, see FOSSANO.

Font, vessel or basin in which the water used for the rite of baptism is placed. In the earliest period the baptistery contained a basin in the floor sufficiently large to allow the immersion of adult converts. When infant baptism became the general rule this was much diminished in size, and was placed higher. When baptism came to be by affusion the size decreased still more, until we arrive at the *F.* as we know it, with a basin usually about 2½ ft. in diameter. The basin is supported on a pedestal which rests on one or more broad steps. The material is generally stone and in the Rom. Church, where the chrism, required to be preserved for future use, is mingled with the water, the *F.* is often lined with lead. In the Middle Ages examples of *Fs.* composed entirely of lead also occur. The exterior is generally octagonal, sometimes circular, square, or hexagonal, and is frequently decorated in a rich manner. The *F.* almost always stands at the W. end of the church.

Fontaine, Jean de la, see LAFONTAINE.

Fontaine-l'Évêque, city of Hainaut, Belgium, 6 m. W. of Charleroi. It has coal-mines and freestone quarries, and manufs. of iron, nails, knives, bolts, chains, boilers, etc. Pop. 8,100.

Fontainebleau (Fontaine Belle Eau, Lat. Fons Bellaqueus or Bleaudi), tn. of Seine-et-Marne dept., N. France, near the Seine, 37 m. S.S.E. of Paris. It is situated in a magnificent forest of 42,500 ac., one of the loveliest wooded tracts in France, and the haunt of landscape painters, notably of the Barbizon school (Rousseau, Corot, Diaz, Millet). There are quarries of sandstone and paving-stones, manufs. of porcelain, glass, and gloves. Grapes are freely cultivated, and there are also breweries. The school of practical artillery and engineering was moved here from Metz in 1871. The anct. royal palace (begun in the thirteenth century) has fine gardens and parks surrounding it. It was formerly one of the favourite royal residences of France. Pop. 15,000. *Consult* R. Pinor and C. Figeac, *Mon-*

graphie de Fontainebleau, 1866; E. Bourges, *Recherches sur Fontainebleau*, 1896; L. Tarso and M. Charlot, *Palace of Fontainebleau*, 1902; Marie Louise Gothein, *A History of Garden Art* (trans. by Laura Archer-Hind), 1923; and E. Pilon, *Fontainebleau* (trans. 1933).

(1895), shows the full influence of the Fr. school of realists. Toured England, and interested himself in O.E. ballads. His *Gedichte* and ballads (*Männer und Helden*) tell of the glories of old-time England. Other novels include *Vor dem Sturm*, a historical romance, and *Der Stechlin*



THE PALACE, FONTAINEBLEAU

D. McLesh

Fontana, Domenico (1543-1607), It. architect, b. at Mellae on Lake Lugano. In 1563 he went to Rome and Cardinal Montalto became his patron; under his auspices he built a chapel in the church of Santa Maria Maggiore and the Villa Negroni. When his patron became Pope Sixtus V. he was appointed chief architect, and built the Lateran Palace, the Quirinal, and the Vatican library. His most remarkable achievement, however, was the removal of the Egyptian obelisk (brought to Rome in the time of Calligula) from the circus of the Vatican to the front of St. Peter's (1586), of which he leaves a written account. When Clement VIII. became pope F. was dismissed and went to Naples, where he became architect to the viceroy, the count of Miranda, and did some good work. His son, Giulio Cesare, succeeded to his post and built the Naples Univ.

Fontana, Prospero (1512-97), It. painter, b. in Bologna. He belongs to that period of the Bolognese school that was influenced chiefly by imitators of Raphael. He executed an enormous amount of work, his subjects being chiefly sacred and profane hist. At Bologna he started a school of art, and among his pupils were Lodovico and Agostino. His masterpiece is the 'Adoration of the Magi,' in the church of Santa Maria delle Grazie at Bologna.

Fontane, Theodor (1810-98), Ger. poet and novelist, b. at Neuruppin, Brandenburg. F. is the novelist of Berlin life, the pioneer of the modern (pre-Nazi) Ger. novel, a typical late nineteenth-century Berlin man of letters. His literary method changed with the years, and gradually moved from historical romance to realism. His masterpiece, the novel *Elli Briest*

(1898). See F. Servaes, *Theodor Fontane*, 1900, and J. Furstenauf, *Fontane und die märkische Heimat*, 1941.

Fontanes, Louis, Marquis de (1737-1821), Fr. poet and politician. In 1783 he pub. a trans. from Pope, *L'Essai sur l'homme*, *La Chartreuse*, and *Le Jour de mort*, and in 1788 *La Verger* and *Épître sur l'édit en faveur des non-calholique*. Under Napoleon he became president of the legislative chamber from 1804 to 1810. His *éloge* on Washington was written at Napoleon's request. His works were collected in 1839 and ed. by Sainte-Beuve with a life of the author.

Fontarabia (Spain), see FUENTERRABIA. Fontenay-le-Comte, or Fontenay-Vendée, tn. 19 m. N.W. by W. of Niort, on the R. Vendée, just where it begins to be navigable, in the dept. of Vendée, France. Hats, woollen goods, and coarse linen are manufactured, but the possession of the beautiful Romanesque church of Notre Dame (fifteenth century and onward) is the city's chief distinction. Pop. 9000; arron. 118,000.

Fontenay-sous-Bois, tn. 6 m. E. of Paris, in the dept. of Seine, France. Commerce is chiefly in charcoal, wood, and the produce of market gardeners. Pop. 30,000.

Fontenelle, Bernard le Bovier de (1657-1757), Fr. advocate, philosopher, and poet, nephew of Cornelle, contributing to the *Mercurie galant* by 1677 (ed. by T. Cornelle). He has been called 'one of the last of the Précieux, or inventor of a new combination of literature and gallantry,' and was in Voltaire's eyes the most universal genius of his age. He wrote tragedies (*Aspar*, 1681), operas (*Psyché*, 1678; *Bellerophon*, 1679), pastorals like Segrais (1624-1701), *Lettres*

galantes du chevalier d'Her (1685) in the style of Voiture (1598-1648). In 1688 he sided with the moderns in the 'Quarrel of Ancients and Moderns.' In La Bruyère's *Caractères* he is satirised as Cydrias. He had a brilliant reputation in the salons of the time, and was at the height of his fame under Fleury's ministry (1726-43). His works include *Poésies pastorales* (1688); *Dialogue des morts* (1683); *Entretiens sur la pluralité des mondes* (1686), maintaining the fascinating paradox that planets and fixed stars are populous worlds; *Histoire des oracles* (suggested by van Dale's work) (1700); *Éloges des Académiciens* (1699-1740). Admitted to the Fr. Academy, 1691, in spite of Racine's and Boileau's opposition, he was also admitted to the Academy of Sciences, 1697, and secretary from 1699 to 1741. His *Éléments de la géométrie de l'infini* appeared 1727; *Théorie des Tourbillons cartésiens* in 1752. See collected works, 1790 and 1825; Charnay, *Biographie de Fontenelle*, 1846; Flourens, *Fontenelle, ou de la philosophie moderne*, 1847; E. Faguet, *Études littéraires sur le XVIII^e siècle*, 1890; and A. Laborde-Milab, *Fontenelle*, 1905.

Fontenoy, vil. 5 m. S.E. of Tournai, in the prov. of Hainaut, Belgium. Here in 1745, during the War of the Austrian Succession, the Fr. under Marshal Saxe defeated the duke of Cumberland and his allies, the onslaught of the Irish Brigade, which was fighting for the Fr., being irresistible. Pop. about 900.

Fontevrault (Fons Ebraldi or the Well of St. Evrault), tn. 9 m. S.E. of Saumur, in the dept. of Maine-et-Loire, France. Here in 1099 Robert d'Arbrissel founded a great abbey where a community of nuns and monks followed the order of F., which received papal sanction in 1106. Pop. 1600.

Fonthill Abbey, see under BECKFORD, WILLIAM.

Foochow, Fuchow, or Fuchau, cap. of the prov. of Fukien, China. It is on the R. Min, 34 m. from its mouth, and has been open to foreign merchants since the first Chinese war in 1842. Suburbs sprawl in every direction, but the city itself is girded by upwards of 5 m. of wall, 30 ft. high, topped at intervals by curious watch towers and pierced by seven gates. The riv. is spanned by the 'Bridge of Ten Thousand Ages,' which is supported by forty granite piers, and which was probably built in the eleventh century. The chief export is tea. After opium the staple imports are woven and metal goods. The prov. of Fukien is its outlet for tinned food, bamboo-pulp paper, and soap. The great arsenal on Pagoda Is. was instituted by Fr. engineers in 1867. Has one of the few dockyards in China. Since 1921 it has been the seat of the Christian Univ. The Jap. occupied F. for some years following their invasion of China, but in May 1945 Chinese troops retook the port. Pop. 314,900 (1926 census of Chinese maritime customs); other estimates give 400,000. For F. in Kiangsi and Liaoning (Manchuria), see FUCHOW.

Food, Adulteration of, see ADULTERATION.

Food and Agriculture Organisation (F.A.O.) was first proposed by the United Nations conference on food and agriculture held at Hot Springs, Virginia, May 1943. An interim commission formulated a constitution for the organisation, which was adopted by a later conference held at Quebec, Nov. 1945. This latter conference estab. the F.A.O., the constitutional purposes of which are to raise the levels of nutrition and standards of living of the peoples under the respective jurisdictions of the United Nations; secure improvements in the efficiency of the production and distribution of all food and agric. products; better the condition of rural pops.; and thus contribute towards an expanding world economy. The functions of the F.A.O. are to collect, interpret, and disseminate information on nutrition, food, and agriculture, and to promote national and international action with respect to scientific and economic research relative to these topics; the conservation of natural resources; the improvement of processing and marketing; the adoption of policies for the provision of adequate agric. credit; and other matters. Provision is made for an annual conference of F.A.O. to determine the policy and approve the budget of the organisation and make recommendations for submission to member nations with a view to national action. The conference may delegate powers to an executive committee, whose members act on behalf of the conference and not as representatives of their respective govts. An F.A.O. conference, which met at Copenhagen in the autumn of 1946, set up a commission with wide powers of reference covering the provision of sufficient food at fair prices for all peoples. The main proposal submitted to the commission was a plan by Sir John Boyd Orr for a World Food Board which would itself enter the market, buying food stocks when production was in excess and releasing them when it was deficient, thus at once ensuring supplies and stabilising prices; but the commission rejected this proposal as impracticable, though it retained some of the essential features of the plan. By means of its surveys F.A.O. will prepare the programmes which would be required to make nutritional standards adequate throughout the world and offer the advice and services, outlined in detail in the commission's report, to make these programmes effective. Policies and measures are discussed at the organisation's ann. conferences, when decisions may be taken by voluntary agreement, and, to strengthen the organisation in handling its volume of work, the commission's report proposes to establish a World Food Council, representing eighteen nations, which will meet if required in the intervals between the conferences. Prices are dealt with in the report on similar lines; there is to be no international purchasing authority, but the producing nations are simply invited to co-operate in pursuing policies of orderly marketing. The report accepts the Brit. proposal that each nation

should build up buffer stocks to be acquired or released by way of smoothing out seasonal fluctuations. At present the report awaits the consideration of the national govts. It is already evident that a mandatory scheme of international regulation is unacceptable by the large exporters, especially Amer. Regret has been expressed that the teeth were taken out of the Orr plan; but at least, if the great exporters of food are willing to see that their interest also lies in co-operation, the commission has offered a means of realising the aims of the Hot Springs conference which originated the F.A.O.

Food and Feeding (like the verb 'to feed', food comes from a Teutonic root, whence O.E. *foda*—cf. 'fodder'). Food is anything taken into the body which is capable of supplying physical energy, promoting growth, repairing tissue, furnishing energy for bodily heat and work, and aid in protection from disease. Man is the only animal who does not know instinctively how to select his food, and so the science of dietetics has evolved. He is also the only animal who cooks his food, which may render it more appetising to some people, but certain foods become less digestible and not so nutritious as in their natural raw state. On the other hand, heat destroys harmful bacteria, particularly in meat and milk (see C. E. Dukes, *Bacteria in relation to Domestic Science*, 1947).

The solid or 'nutritious' components of food fall into the following classifications:

NITROGENOUS

Proteins:

Casein: precipitated from milk, especially by rennet; important in cheese.

Myosin: present in the muscle or fibres of meat.

Gluten: present in the viscid matter (dough) of wheat.

Legumen: found in pulses, i.e. peas, beans, lentils, etc.

Albumen, gelatine: found in egg white, milk, muscle, vegetables, etc.

NON-NITROGENOUS

Carbohydrates: Starches and sugars.

Fats: olive oil, butter, etc.

These two groups, organic in origin, are derived from living organisms. The first, or nitrogenous, group, is essentially composed of nitrogen, carbon, hydrogen, and oxygen; is mainly flesh forming, building up and repairing nitrogenous tissues of the body; and, in the process, supplying a limited amount of heat. The second, non-nitrogenous, group (sometimes called carbonaceous compounds) is composed of carbon, hydrogen, and oxygen, and is the main source of energy and heat. The *inorganic* or *mineral matters* in food include sodium, potassium, iron, sulphur, calcium, phosphorus, iodine, etc. They are necessary for the normal building and functioning of the body, the greatest proportion being found

in the bones. Most of these inorganic matters are contained in organic foods, e.g. iron in meat and egg yolk; calcium and phosphorus in milk; iodine in fish, etc. Vegetables, grown in fertile soil, are also an important source of mineral salts, some of which salts can only be absorbed by the body in their natural combinations in food. Certain mineral matters cannot be utilised by the body unless particular *vitamins* are present. Vitamins are minute substances in natural food, and are essential to health (see DIET). There are also certain complex organic substances which by their presence alone set up catalytic action (enzymes) in the digestive organs; and it is probable that these substances are present in natural foods but, by refinement or concentration such foods become relatively 'indigestible.' *Roughage* in food, i.e. the unabsorbed cellulose from vegetables, fruit, whole wheat, flour, bran, etc., is necessary to supply bulk for the elimination of waste matters; and, in the refinement of foods, valuable material which aids digestion and nutrition is discarded.

The amount of food required in health is determined generally by the size and muscular output of the individual; but the growing child needs relatively more than his parents; and the adult muscular worker requires more energy-producing food than the sedentary worker. The energy value of food is measured in 'calories,' i.e. the amount of heat (great calories) required to raise a kilogram of water 1° C. The calorie value of food varies, e.g. carbohydrate giving only half as many calories as its equivalent weight of fat.

The following table (pub. in 1933, and printed by permission of the Brit. Medical Association) shows the approximate number of calories required for the average child and adult:

MAN-VALUES AT AGES (CATHCART AND MURRAY)

Ages	Calories
Adult male	1·00 3400
„ female	0·83 2840
Child 1 and under 2 years	0·30 1020
„ 2 „	0·40 1360
„ 3 „	0·50 1700
„ 6 „	0·60 2040
„ 8 „	0·70 2380
„ 10 „	0·80 2720
„ 12 „	0·90 3060
Old person (65+)	0·75 2550

A definite proportion of calories should be derived from first-class protein, second-class protein, fat, and carbohydrate, in order to fully supply the needs of the body. The recommended proportion is 6 per cent first-class protein and 6 per cent second-class protein; 27 per cent fat, and 61 per cent carbohydrate. The following table shows the total calorific value of certain foods, together with their protein, fat, and carbohydrate content.

TABLE OF FOOD VALUES. ANALYSIS AND ENERGY VALUE OF EDIBLE PORTION TAKEN FROM TABLES. (R. H. A. PLIMMER, D.S.O.)

Per lb. (or 453.5 (gm.))	Protein (gm.)	Fat (gm.)	Carbo- hydrate (gm.)	Cal- ories
Beef, fore- quarter .	85.3	83.5	—	1126
—, hind- quarter .	75.3	135.6	—	1570
—, corned (Glasgow analysis) .	119.3	84.8	—	1278
Mutton .	50.4	169.2	—	1780
Liver, ox .	90.3	14.5	20.0	587
Sausage, beef .	50.8	80.3	68.9	1238
Suet, beef .	5.4	423.2	—	3958
Dripping, or lard .	—	453.5	—	4219
Fish, cod .	66.2	0.4	—	276
—, herring, fresh .	66.2	39.9	—	643
—, —, kip- per .	64.0	50.4	—	730
—, —, salted .	100.7	57.2	—	944
—, haddock, fresh .	54.4	0.9	—	232
—, —, smoked .	67.6	0.9	—	286
—, ling .	61.7	1.8	—	270
—, mackerel .	49.9	28.1	—	466
Bread, white .	32.7	0.9	218.2	1037
—, brown .	31.8	1.8	216.4	1012
Flour .	45.8	7.3	342.5	1660
Milk (pint) .	18.7	20.4	27.2	378
Eggs .	50.3	45.8	6.3	659
Bacon, streaky .	46.7	245.8	—	2478
—, shoulder .	35.8	261.3	—	2577
Cheese, hard, full milk .	116.6	158.8	14.1	2011
—, skim .	146.1	52.6	42.6	1260
Butter .	0.9	376.5	—	3503
Margarine .	0.9	384.7	—	3579
Sugar, white .	—	—	453.6	1860
Jam .	1.4	—	314.8	1296
Treacle .	7.3	—	271.7	1144
Syrup, golden .	1.4	—	346.6	1427
Cocoa .	82.1	12.16	182.8	2215
Currants, dried .	7.7	1.4	190.5	826
Prunes .	11.3	0.9	153.8	685
Dates .	6.3	0.4	268.6	1131
Rice, polished .	26.8	1.8	364.2	1620
Oatmeal, medium .	54.0	39.0	317.5	1886
Oats, rolled .	59.4	29.5	315.2	1809
Barley, pot .	31.7	3.6	362.4	1650
Beans, haricot .	80.7	2.3	292.6	1552
—, butter .	84.4	3.2	282.1	1532
Peas, whole green, dried .	92.5	2.7	259.0	1467
—, split, yellow .	92.1	3.2	285.8	1579

Per lb. (or 453.5 (gm.))	Protein (gm.)	Fat (gm.)	Carbo- hydrate (gm.)	Cal- ories
Lentils, split, red .	91.2	1.8	289.8	1579
Potatoes, old .	8.6	0.1	82.1	373
—, new .	7.3	0.1	92.5	410
Cabbage .	3.2	0.2	17.7	88
Carrot .	5.4	0.4	43.6	205
Turnip .	5.4	0.4	20.0	108
Tomato .	3.2	0.4	20.4	101
Watercress .	5.9	1.4	13.6	93
Lettuce .	3.2	0.6	5.4	41
Apples .	1.3	0.9	44.4	196
Lemons .	0.9	0.9	4.5	31
Oranges .	2.7	0.4	29.9	137

Most foods contain, in varying proportions, the essential elements to life, proteins, carbohydrates, fats, mineral salts, water, and vitamins. Certain foods have a much larger proportion of one constituent than another, e.g. meat supplying mostly protein and potato mostly starch. Milk, however, is a scientifically complete food, containing all the nutritive constituents to maintain life and promote growth, though the addition of some iron and vitamin C is recommended. Raw cow's milk is generally considered unsafe for human consumption owing to the possible presence of harmful bacteria. It should therefore be 'heat treated,' and this is usually done by pasteurisation. This destroys harmful organisms and some of the vitamin value. The latter may be supplemented by fresh orange juice, rose-hip syrup, etc. Milk is a food for children and invalids; but, to provide sufficient calories for his needs, the average man would need to take about eight pints a day and this would contain more protein and fat than is necessary, and insufficient bulk of unabsorbed matter to act as intestinal ballast.

Protein is the main constituent of protoplasm, and is essential to the body structure. It does, however, supply a limited amount of heat and so may take the place of carbohydrates; but starches, sugars, and fats can never take the place of nitrogenous foods in building and repairing the tissues of the body. Meat, fish, cheese, milk, and eggs provide good proteins. Lean meat and milk are readily assimilated, but cheese is difficult to digest owing to its insoluble fatty matters, but grating or thoroughly chewing renders it more easily digested. Eggs are an ideal food comparing favourably with meat and milk. They contain protein, fat, and mineral matters (particularly iron, phosphoric acid, calcium, etc.). The protein contained in egg white, however, is more easily digested when the myriad cells enclosing it are broken down by whisking or beating. Shell fish, particularly lobster and crab, are indigestible and sometimes contain certain irritant poisons. They should be eaten with caution. Oysters are easily digested but they are not very nutritious.

Carbohydrates (starches and sugars) are obtained mainly from vegetables.

the most important source coming from the cereals wheat, rye, oats, maize, and rice. Green vegetables, fruits, and nuts are also a source of starch and sugar. Wheat, rye, and maize are all used in bread-making, but wheat has the highest food value. Rice contains mostly starch, the whole grains being of better food value than the huskless polished grains. None of these cereals is a complete food as they are somewhat poor in fat and protein, hence the addition of milk, eggs, and butter. Sugar is of great importance as a food, and is derived from various sources, the chief being from the sugar-cane, sugar-beet, and sugar-maple; treacle, molasses, and syrup being by-products. Honey is an invert sugar (*see DIET*). Boiling for some time (as in home-made jam) converts white (refined) sugar into fruit sugar and renders it a more nutritious and desirable food.

Pulses (peas, beans, lentils, etc.) are a rich and economical source of protein, and are a fairly good source of carbohydrate. The soya-bean is rich in protein and fat, but contains little carbohydrate, and for this reason is used in the making of diabetic bread. It is also eaten with rice to supplement its protein deficiency; and a 'synthetic' milk can be made from the powdered bean, which is comparable to cow's milk.

Green vegetables, salads, and root vegetables are a valuable source of mineral salts and vitamins, and many (like the potato and carrot) are rich in carbohydrate. The soil in which vegetables are grown influences their nutritive value. It should be healthy and fertile, as inferior vegetables grown on poor soil are responsible for ill health. Green vegetables particularly should be eaten only when they are quite fresh. The potato is one of the most important root vegetables, and when properly cooked (*see DIET*) is a valuable source of food. Many vegetables may be grated and eaten raw with advantage, especially cabbage, sprouts, spinach, and also some root vegetables such as carrots, beetroot, etc. Young dandelion leaves are ten times as rich in iron as other vegetables. Tomatoes are a valuable source of vitamins. Edible fungi, such as mushrooms, are not very nutritious, and when cooked are indigestible. Vegetables as a source of protein must be considered bulky and indigestible. They contain much water and cellulose and the protein is not as easily assimilated as that from animal sources. Vegetarians supplement this protein deficiency by the addition of milk, cheese, eggs, and nuts.

Fats are an important food, especially to people living in cold climates. They include all the animal fats, vegetable fats, and fish fats (*see DIET*).

Fruit is principally of value on account of its refreshing qualities, sugar, vegetable acids, salts, and vitamins. Much of value lies in the skin of some fruits, but it should always be washed before being eaten. Bananas, figs, dates, and raisins are the fruits which contain a high caloric value, and therefore supply the most

energy. *Nuts* are rich in nitrogenous matter, but indigestible unless ground. They also contain more fat than any other vegetable.

The main constituent of every beverage is water. The chief restorative beverages are tea, coffee, and cocoa; they have a stimulative effect, but are of little nutritive value, except from any milk which is added. Alcohol if taken in moderation with food is a temporary stimulant, but may become a protoplasmic poison or anæsthetic. It stimulates the action of the heart and slightly raises the temp. of the body. There are many diet systems in vogue, both in health and in disease. The anti-uric acid regime known as *purin-free dietary* is the system based on the theory that in such disorders as gout, renal disease, neuralgia, etc., the body retains in its system a preponderance of uric acid and other purin bodies, which results in a poisoning of the tissues. Purins are substances constructed on the base $C_5H_4N_4$, and most appetising foods, such as sweetbread, meat, and meat extracts, oatmeal, lentils, tea, coffee, etc., are rich in them, and should therefore be avoided by those suffering from chronic diseases of all kinds. Foods such as milk, cream, butter, cheese, eggs, macaroni, and fruits of various kinds are, to some palates, less appetising, but are practically purin free. The adoption of this dietary greatly reduces the risks of overeating, and is easier to follow than other diets, restricted along more conventional lines. It should not, however, be followed indiscriminately, as if too little protein food is taken ill health results.

Another system, which has a certain number of adherents, is the practice of living upon foods obtained exclusively from the vegetable world, and abstaining entirely from flesh food and all food obtained by the killing of animals. Vegetarians are usually also total abstainers from all alcoholic liquors. The average vegetarian admits into his diet such articles of food as eggs, milk, butter, cheese, cereals, and some moderate vegetarians even eat fish. The movement took its rise about the middle of the nineteenth century, and the idea was best received in England, where there are numerous vegetarian societies, and restaurants. There are sev. varieties of vegetarian diet, but they all have one point in common, viz., abstention from flesh foods. In all ages there have been idealists who have advocated a vegetable diet, chiefly on ethical grounds, as exemplified by Plato, Plutarch, Shelley, Rousseau, etc., but they never had any very extensive following. The arguments for and against are many. Vegetarians maintain that flesh-eating is responsible for the propagation of some of the most serious diseases, especially cancer and tuberculosis. They also contend that nature provides the means of supporting life in the best and most nutritive form by such products as nuts, seeds, roots, eggs, etc., and not in the comparatively degenerate form of flesh. Anti-vegetarians object that with a purely

vegetable diet, in order to obtain sufficient nourishment, an enormous amount must be consumed and that the waste products are excessive in quantity. Scientific opinion too is unfavourable to vegetarianism, it being held that the structure of man's stomach and intestines proves that nature intended him for an omnivorous animal, his digestive organs being fitted to derive nourishment from every kind of food. The advances in the knowledge of the construction of vegetarian dietaries in recent years have been considerable, one of the greatest developments in extending the bill of fare being the manuf. of nut meats. There are also many vegetable extracts useful for making soups and gravies especially prepared from grains by malting processes. Various combinations of cooked grains exist, such as shredded wheat biscuits and others—all satisfactory foods. Generally speaking, however, vegetable foodstuffs are less appetising than others, and the vegetarian feeder, in consequence, is less likely to indulge in excess.

Diabetic diet, devised for patients suffering from diabetes, consists in removing from the food, as far as possible, everything which easily turns to the formation of sugar in the system, especially all excess of farinaceous food. Gluten bread, that is bread composed of wheat without starch, skim milk, cheese, eggs, meats, fresh fish, and green vegetables are prescribed, and sugars, starches, and all foods of an indigestible nature should be avoided. Saccharin is of great service in this diet, as it supplies the flavour of sugar without its objectionable properties. As regards beverages, sweet wines, liqueurs, ale, stout, cider, and cocoa should be avoided, but brandy, whisky, burgundy, claret, aerated waters, coffee, and tea may be taken with impunity. Milk too is as a rule allowable. Generally speaking a diabetic diet involves the use of foods rich in proteins and fat, and the abstention from those containing sugar and starch.

Banting system, for reducing obesity by means of a strict diet. The effect of this particular system of diet in his own case forms the subject of an interesting 'Letter on Corpulence,' pub. in 1863 by Wm. Banting. He was sixty-six years of age, 5 ft. 5 in. in stature, and weighed 202 lb., and by strict attention to diet managed to reduce the total amount of fat and in little more than a year lost 46 lb. of bodily weight. For breakfast he took from 4 to 5 oz. of any meat except pork; tea; and dry toast or biscuits. For dinner he took from 5 to 6 oz. of any fish except salmon; any meat except pork; any vegetable except potato; any kind of poultry or game; two or three glasses of unsweetened wine; and a small quantity of dry toast. His tea he always took without milk or sugar, and his supper was similar to dinner. He made his own case widely known by the circulation of his pamphlet, and his system was tried by numerous people and proved to be a great success. The large amount of meat, however, in this diet would be unsuitable in many cases, and

such a radical change should not be adopted without medical advice, as a prolonged course might have the effect of setting up dyspepsia. Weight can now be scientifically reduced by a definite diet which satisfies the requirements of the body but contains foods with a low caloric value.

Chloride-free Diet.—This is a recognised system in some of the leading hospitals of Paris, and consists of a diet prepared, cooked, and eaten without salt. Foods are selected containing the minimum of inorganic salts, and no salt is added either in the cooking or as a condiment. This diet is especially recommended in the treatment of chronic kidney disease, dropsy, heart diseases, persistent diarrhoea, etc. In many cases the beneficial results of the treatment are quite remarkable, and leave no doubt as to the therapeutic value of a salt-free regime. Milk, butter, fruits, jellies, tea and coffee, bread made without and cereals cooked without salt constitute a practically salt-free dietary.

Hay System (medical director Wm. Howard Hay, M.D.) had, and still has, a certain amount of popularity in America and elsewhere. It is based on the theory of the incompatibility of certain foods, and condemns the eating of carbohydrate foods with protein foods. Its aim is to maintain a high alkalinity of the body fluids by the eating of less meat, eggs, fish, and cheese, and these protein foods should only be taken with vegetables (but no starchy tubers) or salads, and followed by fresh acid fruits, omitting starchy sweet foods. Natural unrefined starches and sugars may be eaten with cooked or raw vegetables (including potato) and sweet fruits such as dates, figs, or raisins, with honey and cream.

Artificial feeding.—This occasionally has to be resorted to in the case of disease and grave illness, when food cannot be taken through the mouth, and when it is essential to try the artificial method, subcutaneous or intravenous.

Food-poisoning.—In times past this particular form of poisoning was thought to be extremely common, but at the present day it occurs only very rarely. Epidemics sometimes occur, but instances are not common. Food-poisoning may be classified under three main types: Metals, animal parasites, and plant parasites. Arsenic, lead, copper, antimony, tin, and zinc are the principal metals which have been known to cause poisoning in food. There was a widespread epidemic of poisoning by arsenic in Manchester and neighbouring cities of England from beer-drinking in 1900, which, on examination, was found to be due to the glucose used in the manuf. of beer. Lead-poisoning frequently follows the use of water which has been conveyed through new lead pipes, or it may result from the use of leaden colouring matters in biscuits, bread, and cakes. Zinc- and copper-poisoning may result from eating canned foods, but this is rare. The tins, however, should be wiped clean before inserting an opener, and the contents removed immediately into a clean

vessel. Dangerous and sometimes fatal cases of poisoning result from eating sausages, pork pie, game, shell-fish, etc. The symptoms are serious gastro-intestinal irritation, developing either immediately or four or five hours after food. The common occurrence of poisoning by eating canned lobster, crab, or other shell-fish is due chiefly to the rapidity with which they decompose after the can has been opened. A peculiar type of poisoning from milk, ice-cream, cheeses, etc., is also known, and seems to be due to the presence of a toxic substance. The most general poisons from vegetable foods are due to eating poisonous mushrooms, and the grains affected by ergot and allied species. Mineral oils, including medicinal paraffin, have harmful effects, and should not be used instead of edible oils in home cooking.

Preparation and cooking of Food.—This has much to do with its nutritive value, and many articles which, when raw, are unfit for nourishment, become nutritious when cooked. Well-cooked food is wholesome and appetising, while the same material badly cooked is unpalatable. Cooking serves three distinct purposes. It alters the physical condition and structure of the food, renders it appetising by improving the appearance and flavour, and kills by means of heat any disease germs, parasites, or such-like organisms the food may contain. This last is a very important matter and applies to both animal and vegetable foods. Scrupulous cleanliness should also always be observed in serving and keeping food. Every care should be taken to ensure this for the sake of health. If kept or handled under unhealthy conditions, food, and drink too, become very dangerous purveyors of disease.

Food and National Health.—The continued austerity of the Brit. diet after the Second World War prompted sev. medical bodies, such as the Brit. Medical Association and the Central Council for Health Education, to review the prospects with some care. The maintenance of health since 1939, together with improvement in many mortality rates, and in height and weight records of children, suggests that the diet had been on the whole a well-balanced one. Medical opinion favours the retention of such features of the diet as have plainly helped to secure the health and stamina of the public. It seems agreed that sev. elements have acted in combination to produce the good effect. Among these are the provision of milk to special groups, the availability of fruit juices for these groups, the use of a lightly milled flour, the higher, but as yet by no means adequate, consumption of vegetables (including potatoes), and the lower consumption of sugar. It is considered further that the average diet would be improved by a somewhat higher consumption of cheese than was the pre-war habit, a higher consumption of fat fish, and a more general provision of milk and eggs. Implicit in the medical view is the realisation that a thorough educational campaign is needed to persuade the public to maintain the beneficial features of

the wartime dietary, especially in regard to the lightly milled flour and the moderate consumption of sugar and sweetened foods.

See also ADULTERATION; COOKING; DIET; DIGESTION; FERTILISERS; HYGIENE; MANURES; NUTRITION.

Bibliography.—Sir H. Thompson, *Foods and Feeding*, 1894; Knight, *Food and its Functions*, 1895; A. E. Leach, *Food Inspection and Analysis*, 1904; Chittenden, *Physiological Economy in Nutrition*, 1904; A. L. Winton, *Microscopy of Vegetable Foods*, 1906; H. W. Wiley, *Foods, their Adulteration, Manufacture, and Composition* (3rd ed.), 1918; W. G. Savage, *Canned Foods in relation to Health*, 1923; Ministry of Health, *Report on Preservatives and Colouring Matter in Food*, 1924; R. Hutchinson and V. H. Mottram, *Food and the Principles of Dietetics*, 1929, 1940; D. Paterson and J. F. Smith, *Modern Methods of Feeding in Infancy Childhood*, 1931; Violet G. Plimmer, *Food Values at a Glance*, 1935; E. E. Claxton and Lucy Burdekin, *Weight Reduction: Diet and Dishes*, 1937; Sir A. Howard, *An Agricultural Testament*, 1940; Sir J. Boyd Orr and D. Lubbock, *Feeding the People in Wartime*, 1940; Sir R. McCarrison, *Food*, 1940; M. E. Lowenberg, *Your Child's Food*, 1940; G. M. Dark, *Food Poisoning*, 1943; Innes H. Pearce, M.D., and Lucy H. Crocker, B.Sc., *The Peckham Experiment*, 1943; Lady Eve Balfour, *The Living Soil*, 1943; Sir J. Boyd Orr, *Food and the Public*, 1945; C. E. Dukes, *Bacteria in Relation to Domestic Science*, 1947; V. H. Mottram, *Human Nutrition*, 1948; D. P. Hopkins, *Chemicals, Humus, and the Soil*; United States Public Health Reports, Washington; P. L. Yates, *Food Production in Western Europe*; W. Hay, M.D., *Building Better Bodies*; H.M. Stationery Office, *Vitamins: a Survey of Present Knowledge* (Medical Research Council); and the bi-monthly Jour. *Food Research* (H. K. Lewis).

Food Control, British, in Wartime.—*The First World War* (1914-18).—During the first two years of the war gov. interest in food was concentrated on the rationing of troops rather than on the food supply of the nation. But matters became acute in Britain about the middle of 1916, and in Oct. of that year a royal commission on wheat was set up, which soon expanded into an organisation for controlling the wheat supply of Great Britain, France, and Italy. In the same year a food controller was appointed (Lord Devonport), and later a Ministry of Food was created. In the spring of 1917 the gov. took over the supervision of all flour mills, and the people were exhorted to ration themselves according to a certain scale. The Ger. submarine campaign was also making itself felt in connection with the supply of food, and there were signs of growing unrest among the people. At this time sugar was rationed, but the system was extended to other commodities, and brought into being numerous F. O. commissioners to administer the system. The following are some specimen rationed articles per head per week:

sugar 8 oz., butter and margarine 5 or 6 oz., lard 2 oz., meat 1s. worth, bacon and ham and other meats varied amounts, 'am 4 oz., cheese 2 oz., and tea 2 oz. This scheme of rationing ended the queues which had previously gathered at shops and solved the problem of food distribution in a manner that caused little hardship. Towards the middle of the year the submarine peril was practically overcome (*see* VINDICTIVE; ZEEBRUGGE).

The Second World War (1939-45).—As in the First World War the gov. had to regard national feeding as of overriding importance, and again the problem arose as to the means of operating national control of foods through a centralised organisation. The circumstances in Sept. 1939 were, however, very different from those in 1914; for the gov. now had the documented experience of 1914-18 and of the application of public rationing, besides the experience of various marketing schemes under which elaborate national organisations were formed. In anticipation of war a special food (defence plans) dept. had been set up in the Board of Trade in 1936. Towards the end of 1939 the real food problem became evident; it was not that of feeding the nation so much as that of fixing prices at levels to suit every one, including the consumer. Meanwhile the food (defence plans) dept. had prepared commodity plans and in a report of 1937 issued a statement of general policy, including the following principles: The experience of the war (*viz.* 1914-18), shows that if control is to be effective in maintaining supplies and holding prices, it must be introduced before a shortage has arisen and prices begun to get out of hand; all food should be controlled by a single authority; the food controller should ensure that every one would be able to obtain a fair share of the national food supply at a reasonable price; whenever control had to be imposed the transition from normal trading to wartime control should begin to take effect within a few hours; and experience showed that if prices were to be controlled demand as well as supply must be regulated.

The Essential Commodities (Reserves) Act of July 29, 1938, estab. a fund and empowered the Board of Trade to proceed with storage of essential food. Trading interests influenced the plans to the extent of centralising control in the first instance through the large importing and wholesale houses with subsequent application through retailers to the public. Nearly a score of food divs. for regional application of plans were set up in Britain. Food committees estab. under the local authorities were responsible for registration of retailers, ration control of the consumer, and licensing of local manufacturers. This was the first deviation from the principle of control through one central authority and in consequence there was some overlapping of functions. The gov. then provided for committees at all stages of handling food on the general foundation of an independent chairman, civil servants, and trading

interests. Ration books were printed to ensure the retail control of such commodities as sugar, meat, bacon and ham, butter, margarine, and cooking fats indicating that demand control in these specified foods was held to be essential. On Aug. 31, 1939, before the declaration of war, the gov. issued the Acquisition of Food (Excessive Quantities) Order, making it an offence for the public to buy more than one normal week's supply of food. F. G. committees appointed by local authorities were estab. under constitution orders. Requisition and control orders authorised the acquisition and control of stocks of imported foods and feeding stuffs and of home-produced foods in quantities exceeding stated amounts in any stores exceeding a given capacity. Thus the first application of control operated from the importing or large-scale wholesale end without effective check on consumer demand.

The next step was the fixing of maximum prices of most commodities under provisional orders limiting prices to the highest figures secured in ordinary market conditions before the war. A series of Maximum Prices Orders controlled all stages from production to consumer. These allowed increases to satisfy reasonable demands of home producers and the chief trading interests, covering higher costs due to war risk insurance, freight charges, etc. The gov. held imported stocks and *pro tanto* became an early war profiteer. But on the other hand the gov. subsidised producers on condition that retailed prices remained low to the consuming public.

It is 'fair to state that government food plans were originally intended to maintain low food prices to the public, to take powers to fix maximum prices at all stages, to rationalise transport and to pool supplies, and so were theoretically means towards complete nationalisation of food supplies. Price levels were to be advanced only in response to proved increases of cost.' In spite of all previous experience, however, the gov., generally too late to anticipate price advances, tried to legalise higher price levels, whilst warning interested parties of the dangers of exceeding maximum control prices. For a well-reasoned statement of the problems involved in feeding the nation in peacetime and wartime *see* G. Walworth, *Feeding the Nation in Peace and War*, 1940.

The war brought about a considerable tightening in the supply situation: in the case of the United Kingdom this was caused chiefly by the necessity of husbanding shipping space required for imports; while in the case of Sweden and Switzerland the continental blockade reduced imports to a fraction of peacetime requirements. Nevertheless in spite of these difficulties the overall situation was less strained than on the Ger.-dominated continent, and left room for more flexible systems of rationing than in Germany. The good supply of bread and potatoes meant that each individual had the opportunity—as distinct from the totally

rationed pops. on the Continent—to consume as many calories as his individual requirements indicated. While the purpose was to maintain a diet adequate in all essential nutritive elements, this end could only be achieved with the greatest economy of means, and foods requiring more shipping space, land, and labour were reduced in favour of those requiring less. Rationing was concerned mainly with protein foods, milk, and fats. The need for these foods varies less between different groups than does the need for other nutritive elements, and it was found possible to adopt a system of relatively undifferentiated individual rations. Nevertheless it was recognised that an overall *per capita* rationing was not capable of taking into account all special nutritional needs which were then met by various schemes superimposed, as it were, on the basic system. The most important of these schemes were communal feeding, and schemes for the distribution of protective foods, namely milk, eggs, and certain fruit and fruit juices for which special ration cards were given. The best known and most important of these schemes related to milk. In addition children received through welfare and maternity clinics quantities of fish liver oil and fruit juices. A third scheme was the use of 'points rationing.' Each consumer receives a card containing a certain number of points, and the commodities are 'priced' not only in ordinary currency but also in points. At present tinned meat, some fish, and beans for instance, are (1949) under point rationing. The system renders it possible to include or exclude foods as the situation demands, and through the double mechanism of price and point changes demand can be steered in the direction desired. At the same time the system leaves a considerable latitude of choice to the consumer (consult *Food Rationing and Supply*, 1943-44, issued by the Economic, Financial and Transit Dept. of the League of Nations (Geneva), 1944).

In contrast with the First World War, when profiteering in produce was found to be a constant evil, the Gov., by combining excess profits tax with price control prevented profit from war.

Food; Council. The prices of food remained at a high level for some years after the First World War had ended, and there were frequent complaints that traders were demanding unjust prices. Profiteering was a constant reproach levelled at middlemen and producers. The result was that a royal commission was appointed to investigate these complaints, and after its report in April 1925, a F. C. was set up in July of that year which consisted of twelve members, under the presidency of Lord Bradbury. Probably the remedy was belated, for about this time the ordinary laws of competition began to reassert themselves. The council from the first was a somewhat impotent body, for it had no power to compel witnesses to give evidence; nor indeed any power to enforce its recommendations. One useful piece of legis-

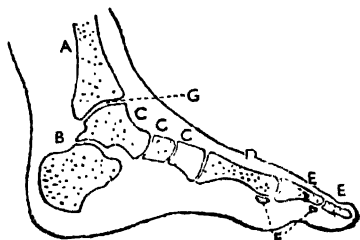
lation, however, the Weights and Measures Act, 1926, resulted from its activities.

Food Poisoning, see under FOOD and FEEDING.

Fool, see JESTER.

Fools, Feast of (Lat. *festum fatuorum stultorum*, or sometimes *asinorum*), grotesque masquerade or medieval Christian merrymaking, taking place more particularly on Holy Innocents' Day (Dec. 28), but extending more or less over the whole period between Christmas and Epiphany. Probably a survival of the old Rom. Saturnalia, it crept into the ceremonial of the Christian Church in spite of the fierce anathemas of fathers and councils, and even after the Protestant Reformation an observance of it was kept at Antibes (1644). The festival apparently originated in France, and was first mentioned by J. Belet (twelfth century). The aim professed was to interest people in the story of the Advent, but the boisterous drollery soon degenerated into profanity. Usually the donkey played a leading part in the pageant. Mock popes, cardinals, and bishops were elected with ridiculous titles, and the most sacred Christian rites were travestied. See Du Tillot, *Mémoires pour servir à l'histoire de la fête des Fous*, 1741; Schneegans in Müller's *Zeitschrift für deutsche Kulturgeschichte*, 1858.

Foolsap, long folio writing or printing paper, so called from the device of a fool's cap and bells originally used as a watermark. This mark became obsolete by 1795. It varies in size from 12 in. by 15 in. to 13 in. by 16 in. (for writing); double F. for writing and printing is 17 in. by 27 in.



LONGITUDINAL SECTION THROUGH THE FOOT IN THE LINE OF THE BIG TOE

A, tibia; B, bone of the heel; C, tarsal; D, metatarsal; E, phalanges; F, sesamoid bones; G, ankle joint.

Foot. In the human F. the bones are twenty-six in number, arranged in three groups, viz. the tarsal, or hindmost bones, the metatarsal, and the phalanges of the toes. A certain amount of elasticity is given to the F. by the cartilage with which the bones are covered and by the slight movements of which each bone is capable. The weight of the F. is borne on three distinct points; the heel, the point where the big toe joins the first metatarsal bone, and a similar point at the base of the little toe. The elasticity of the F. is greatest in the arch,

composed of five long bones, sloping gradually to the ground. The bones of the F. are all held together by short ligamentous bands of great strength.

Foot, unit of lineal measure used in Great Britain and U.S.A., estimated very roughly as the length of the human F. (traditionally the king's). The Brit. standard or statute F. is one-third of a yard, or 12 in. A square F. contains 144 sq. in., a cubic F. 1728 cub. in.

Foot-and-Mouth Disease, or **Murrain**, eruptive fever, caused by an undiscovered virus, beginning without warning, spreading with great rapidity. All animals, even human beings, are susceptible to attack. It is not necessarily fatal, but the vesicles or little tumours which appear in the mouth and between the toes cause affected animals to lose condition, the milk yield to deteriorate, and animals with young to abort. Lameness is often the first symptom noticed, the animal smacks its lips, and saliva drips from the mouth. In 1883 the disease caused much loss in Great Britain, but from then till 1910 the country was practically free. F.-and-M. D. is compulsorily notifiable. During recent years local outbreaks have been successfully met by rigid methods of isolation and the prevention of movements of cattle from the area affected.

Football, game in which two teams of players play with a ball. There are two main codes of F. in this country, Rugby and Association; the former allows the ball to be carried as well as kicked, whilst in the latter game handling is prohibited, except by the goalkeeper. The affairs of the Association game are in the hands of the F. Association, whilst the Rugby Union controls those of the handling code. Sev. public schools, such as Eton, Harrow, and Winchester, play varieties of F. peculiar to themselves. The game as played in the U.S.A. is now very different from the Rugby Union game on which it was modelled. From the earliest times games with a ball were probably in vogue, and we have record of some amongst both the Gks. and Roms. The Gks. had a game which consisted simply in throwing the ball from one person to another, another game (*ἀντροπας*) in which the ball was struck with the palm of the hand on to the ground as often as possible, and one called *βασιλευβα*, in which the players threw from one to another, with tricks and feints. None of these games had so much in common with F. proper as the Gk. *ἐπισκευπος* and the Lat. *harpastum*, the latter of which was in all probability the precursor of Eng. F. Pollux describes the latter as a game in which the players, divided into two bands, strove to carry the ball over two lines. There is no historical evidence to show that the Roms. actually introduced *harpastum* into Great Britain, but the probability is that they did so. There is no doubt, whatever the precise origin of the game, that it was known at a very early time in England. Its name occurs before that of any other athletic sport which is popular at the present day. W. Fitzstephen, in his *History of London* (c. 1175) speaks of the

young men of the city annually going into the fields after dinner to play at the well-known game of ball on the day *quoddiditurn Carnilevaria*, and as far as is known this is the earliest definite mention of F. in England. It is notable that Shrove Tuesday seems to have been the day on which more than all others F. was played, and the custom of a rough and tumble game on that day still survives in some parts of the country. At Derby, for instance, all the able-bodied men in the pars. of St. Peter's and All Saints took part in the contest. The game began in the market-place, a large ball being tossed up in the middle of the bands. The goals in such games were at opposite ends of the tn., and nothing stopped the players, who took the ball through water if necessary, and recked nothing of broken heads, torn clothing, and such details. This is also an ann. event at Athorstone (Warwickshire). Such ball-play was popular also among the anct. Scots, for we find the Shrovetide game at Scone, in the co. of Perth, described by Sir F. M. Eden, in his *Statistical Account of Scotland*. A feature of these games was their length, as they lasted in most cases for the major portion of a day. Fitzstephen, writing in the twelfth century, says that 'the boys annually on Shrove Tuesday play at the well-known game of ball.' Many further proofs of the popularity of F. among the anct. residents of the country are forthcoming. In many of the games every able-bodied man was compelled to take part in the contest: the day was made a general holiday, and any player who was fortunate enough to ground the ball in goal was a popular hero. In all these early contests the element of danger both to life, limb, and property was considerable, and sev. proclamations were issued at various times forbidding it. Edward II., as a result of a petition of the citizens of London, issued a proclamation on April 13, 1314, commanding and forbidding the game to be played in the city in future, 'as many evils may arise, which God forbid.' In 1349 Edward III. pub. a proclamation against F. and in favour of archery; similar writs to that then issued at London were sent to the sheriffs throughout England. In the time of Henry IV., A.D. 1410, we find F., prohibited in Normandy, described among the *jeux importunes*, and again in the statute 12 Richard II. c. 6. James III. of Scotland ordered in 1447 that 'football, and golfe, be utterly cryed down and not to be used,' and a royal proclamation was made in England in 1491 against the same two sports. F. was by no means stopped by these prohibitions, being played to a very great extent in the reign of Elizabeth. There were still no set rules for the conduct of the game, and no referees or umpires; consequently the number of accidents was large, and some of them were fatal. Proclamations continued to be issued against the sport, as in 1572 and 1581. In the seventeenth century various names appear to have been given to it; in Cornwall it was called hurling, and in the E. cos. camping or camp ball. An exception to the rule of

hostility to F. among kings was furnished by Charles II., who made a match at F. between his own servants and those of the duke of Albemarle in 1681. During these times there was practically no opportunity for the working classes to indulge their liking for F. save on Sundays, as there was no Saturday half-holiday then. This desecration of the sabbath naturally provoked the wrath of the religious people of the time, as is forcibly expressed by P. Stubbes in *The Anatomy of Abuses in*

has gradually assumed control of the Association game or 'soccer,' over which it is now the supreme authority in this country and the Brit. Commonwealth. The F. League, consisting of the eighty-eight clubs of the First, Second, and Third Divs., controls the prin. professional matches in this country. It sends six representatives to the F. Association Council, and it deals with all questions appertaining to the league management, promotion and relegation, fixtures, regis-



Central Press Photos Ltd.

ASSOCIATION FOOTBALL: THE GOALKEEPER SAVES FROM A CORNER KICK

An incident in the England v. Scotland international match at Wembley, April 9, 1949.

the Realm of England (1583). Towards the end of the eighteenth century F. waned in popularity, and between 1820 and 1840 it was hardly ever played. But it survived. The reason for its survival must be looked for in the public schools, which each had a game peculiar to itself in many respects. The prin. features of these games will be dealt with later, but the natural wish of the old boys of public schools to continue playing was primarily responsible for the revival of the game and the development of Association F.

The first attempts to originate a code of rules to enable old boys to play together was made at Cambridge Univ. in 1846. Between that date and 1863, the date of the formation of the F. Association, sundry unsuccessful attempts were made to reduce the numerous school rules to one satisfactory code. In 1855 the Sheffield club was formed, in 1857 the Hallam club, and in 1859 the Forest F. club, afterwards the famous 'Wanderers.' In 1863 the F. Association was started, and

trations, and transfers of players, wages, talent money, benefits, protests by clubs and players, and similar affairs which are the direct domestic concern of the league. Similar associations govern the game in Scotland, Ireland, and Wales. There are two professional leagues in Scotland, Div. A and Div. B, promotion and relegation principles applying as in England.

Apart from these Scottish and Eng. leagues there exist throughout the country minor professional leagues. Perhaps the best known are the S. and Midland leagues. Others include the E. cos. and Cheshire co. leagues, and the Birmingham Combination. Many Eng. league clubs run reserve sides in these organisations. The F. Association also sponsors minor leagues, schools football, and National Youth championships.

Amateur F. flourishes more particularly in the S. The amateur leagues are controlled by the Amateur F. Association or, in some cases, the Amateur F. Alliance. Well-known amateur leagues include the

Isthmian, Athenian, Corinthian, and the Spartan Leagues. Possibly the best known of all amateur clubs in England is the Corinthians, who amalgamated with the Casuals in 1938. In 1895 the England team that met Wales was composed entirely of Corinthians. Their first tour was in S. Africa in 1897, and few clubs have done more to popularise the amateur game. Their name used to attract players from all over the country, although it has been said that the 1938 fusion was not a success. Another famous amateur club is Queen's Park, who compete in Div. B of the Scottish League.

In the early years of the game there were naturally many changes in the laws. Until 1869 handling the ball was permitted under certain conditions, but in that year the practice was abolished. The game is played with eleven men on each side, the formation being five forwards, three half-backs, two full-backs, and a goal-keeper. In 1911 a new off-side rule was made, which provided that a player could not be off-side in his own half of the field. When a player plays a ball any other player of the same side who at the moment of playing is nearer his opponents' goal-line is off-side unless three or more of his opponents are at such moment of playing nearer their own goal-line. The field of play is 120 yds. by 80 yds. (full-size). The goal posts are 8 yds. apart; the goal area is a space 20 yds. by 6 yds. in front of the goal, and the penalty area is a space 44 yds. by 18 yds. in front of the goal. When a player handles the ball or commits a foul inside the penalty area, the opposing team is awarded a penalty kick. The ball is placed on a spot 12 yds. from the goal, no player being allowed to stand between the ball and the goal-keeper. The penalty kicker endeavours to place the ball between the posts, only the goal-keeper being allowed to intercept the ball. The ball is kicked off at the beginning of each half period and after each goal, by the centre-forward in the centre of the field within the kick-off circle, 20 yds. in diameter. In 1936-37 a new rule came into force whereby a player is not allowed to try to kick the ball while it is in the goal-keeper's hands. It is also unlawful for the goal-keeper to punt the ball at the goal-kick; nor may he handle the ball outside his own penalty area and, in any event, may not carry it more than four steps without bouncing the ball on the ground. Providing he bounces it every four steps he can carry the ball anywhere within his penalty area. The ball is round, leather-covered, weighing 13-15 oz. and 27-28 in. in circumference. A goal is scored when the ball is kicked or headed between the goal-posts and under the horizontal bar. A goal may be scored from a free kick. The referee is assisted by two linesmen, who watch particularly when the ball goes into touch, and advise the referee when so asked. The referee has power to send off any player guilty of violent and ungentlemanly conduct, and his decision in all matters is final. During the 1948-49 season the F. Association rule 12 was rewritten to cover obstruction

of a player. If a player charges or obstructs a player who is not within playing distance of the ball, a foul is committed. The rule, however, does not define what the F. Association regards as 'within playing distance,' and leaves it to the judgment of referees, whose interpretations naturally often vary.

The most important competition of the year, because open to all clubs, is the Eng. Cup. This was instituted in 1871, and in the first years only very few teams competed for it, but their number has gradually grown, until now the first qualifying round for the trophy is played off in the first month of the season. The Scottish Cup was started two years later, and Ireland and Wales now have similar cups. Owing to the greater skill of professional footballers, the Eng. Cup is practically a competition for such teams, as no amateur club of recent years has survived longer than the first round of the competition proper. The present Eng. Cup is a modern vase; the original was stolen from a shop window in Birmingham in 1895 while Aston Villa were the holders.

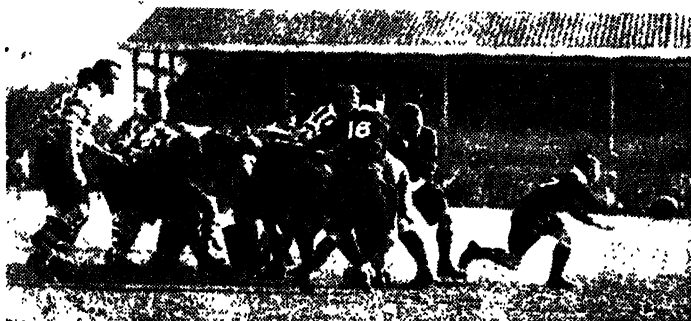
The cup is open to all clubs in the country. By a series of preliminary rounds, however, the vast number of entries are whittled down to the first round proper, when the Eng. League clubs join in. The same principle applies to the Scottish, Irish, and Welsh Cups, entries being confined to the applicable countries.

F. played on the Continent is on the same principle as that in England. Generally, though, a less severe interpretation is placed on their rules, particularly with regard to the obstruction rule. This is always brought to notice in matches between England and other countries. In recent years F. has become increasingly popular in other parts of the world, even finding a foothold in America, whose national game is baseball. Russia has taken it up in recent years, and their premier club, the Moscow *Dinamos*, played sev. leading Eng. clubs in 1946.

Rugby Union Football, or *Rugger* as it is generally termed, in contradistinction to soccer, is governed by the Rugby Union, which was founded in 1871 by the Blackheath and Richmond clubs principally. Many members of the Union are clubs associated with schools, univrs., and the armed services. The laws of Rugby F. were recodified and issued in their present form in 1926. The ball used is oval in shape and composed of the same materials as an Association ball; its length is from 11 to 11½ in.; its circumference, measured lengthwise, 30 to 31 in.; measured over the width, 25½ to 26 in.; and its weight at the beginning of a game is between 13 and 14½ oz. The score is made by means of tries and goals. A try is scored when the ball is touched down by one of the attacking side behind the opponents' goal line. A goal is scored when the ball is kicked over the crossbar and between the uprights of the opponents' goal. The width of the goal is 13 ft. 6 in., and the height of the crossbar is 10 ft.; the uprights extend for over a foot above the crossbar, and the ball may pass between them at any height. The

field of play is 75 yds. by 110 yds., lines are drawn parallel with the goal lines at a distance of 25 yds. out, these being known as the 'twenty-fives.' A goal may be scored in four different ways: (1) When a try is scored the ball is brought out any distance desired from the place where it was 'touched down,' at right angles to the goal line, and a place kick is taken. If this results in a goal, two points are added to the three already gained for a try. (2) A dropped goal is a goal from a drop-kick, which is a kick where the player drops the ball on the ground and kicks it immediately on the half volley. (3) A goal from a 'mark,' when a player catches the ball from a kick by the opposing side he may, instead of running with it, strike his heel into the ground and claim a mark.

once picked up) or a scrumage is formed. A 'scrum' consists of the opposing forwards packing in two bodies, generally three, in the first mark, then two, then three again, and shoving at each other. The ball is put into the scrum by the 'scrum half' of the side which did not commit the breach of the rules causing the scrum, and must be 'heeled out' as quickly as possible by the forwards to the rear, where the half is waiting for it. Offences which are punished by free kicks are handling the ball in the scrum, 'feet up' in the scrum; hacking, tripping, and impeding, and tackling an opponent who has not got the ball. The most common offences are passing forward, knocking on, and offside. If the ball is kicked into touch it belongs to the side which did not kick it in; if



Topical Press

RUGBY FOOTBALL: THE BALL COMING OUT OF THE SCRUM

A free kick may then be taken, and if a goal results it counts three points. (4) A penalty goal is a goal scored from a place kick which has been given as a penalty against the opposing team for some breach of the rules. A team consists of one full-back, four three-quarter backs, two half-backs, and eight forwards. The New Zealand team introduced an alternative formation, consisting of one full-back, three three-quarters, two five-eighths, two halves, and seven forwards. Seventy minutes, thirty-five in each half, is the usual time played. The choice of kick-off or goal is decided by tossing, and the kick-off is made from the centre of the half-way line. Any player who is onside may run or kick directly after the kick-off. A player is offside if he gets in front of the ball during a scrumage (this applies especially to the halves), or if the ball has been kicked or is being run with by one of his own side who is behind him; when an opponent has kicked or touched the ball, or when one of his own side, with the ball, or the kicker of the ball in any case, has run in front of him. The ball must not be passed forward, or 'knocked on.' When a player is fairly tackled by an opponent he must at once drop the ball, which is then kicked on (it must not be at

carried into touch, to the side carrying it. A 'line out' is formed when the ball has gone into touch; the half-back who throws the ball in must throw it at right angles to the touch line, or a scrum is held where it deviated from the straight line. When a player has crossed the touch in goal line, after a player has touched the ball down behind his own goal, and after an ineffectual attempt to place a goal from a try has been made, the ball is dead. If, however, a player carries the ball over his own goal line and then touches down, a scrum is held 5 yds. out from the goal line, opposite where he touched down. In the cases where the ball is dead a drop-kick or punt is taken by the defending side from their '25'; all the men of the side must be behind the man who takes the kick, or they are offside. A referee is in charge of the game, assisted by two touch judges with flags, which they hold up where the ball goes into touch; they also assist the referee in judging goals. No professionalism is allowed by the Rugby Union, a rule that led in 1893 to the formation of the N. Union, renamed the Rugby League in 1922.

Rugby League.—The professional game differs somewhat from the Rugby Union game. Only thirteen players form a team,

and the scoring is slightly different; the result of the alterations is a more spectacular type of F. Rugby League games are confined to the N. of England, particularly Lancashire and Yorkshire. Only one match throughout the season takes place in the S., this being the league cup final at Wembley, an innovation of recent years. The league is organised on the same basis as F. leagues, with various divs., relegation, and promotion principles.

The Eton games.—There are two separate varieties of F. played at Eton, the wall game and the field game. The former game is played by only a small proportion of the boys, but is interesting from its peculiarities. The ground is bounded on one side by a wall about 9 ft. high and 120 yds. long; on the other side by a line drawn parallel to the wall at a distance of 6 yds. from it. Another wall containing a door runs at right angles to the wall, and at the other end of the ground is a large elm; the door and a chalked space on the trunk of the tree form the two goals. Scoring is by shies and goals, one of which outweighs any number of shies.

The field game is more generally played at Eton. The ground is 150 yds. by 100 yds., and goals 12 ft. in width and 6 ft. high. Eleven players form a side, divided up into eight forwards and three behinds. The game is begun by a 'bully' in the centre of the field. Four players form the bully; just outside the bully on each side is a corner, and an 'extra corner' on one side, whilst just behind is the 'flying man'; then comes the 'short behind,' the 'long behind,' and the 'goals.'

The Harrow game is played with a ball which resembles a church hassock in shape, flattened at the sides and irregularly circular elsewhere. The ground is about 150 yds. by 100 yds. Two upright poles without any crossbar, 18 ft. apart, mark the goals. A goal is scored by kicking the ball between them at any height. Any number of players may form a team; in matches the number is eleven.

The Winchester game is played with a ball slightly smaller and lighter than an Association ball. The ground is 80 yds. by 25 yds. A net runs along each of the long sides to a height of 10 ft., and a line of stakes and ropes 1 yd. inside the net. This enclosed space is called under ropes. A furrow, called 'worms,' is marked on each short side. A goal is scored by kicking across worms, but the ball must not touch ropes, stakes, or nets, or an opponent.

American football.—From colonial times until 1871 a kind of Association F. was played by the colleges in the U.S.A. A 'soccer' championship has been in existence since 1913, and those clubs which have won on more than one occasion are the Bethlehem Steel Company F. club and the Fall River F. club. In 1871 a code of rules founded on Eng. Rugby was imported from Canada and played under, at first, by

Harvard Univ. The laws were not very satisfactory, however, and in 1876, after a match had been played with Yale under mixed rules, the Rugby Union laws were adopted generally. An ann. convention was appointed to modify the rules as required, but the roughness of the game reached such a pitch that at one time the authorities forbade the matches between Harvard and Yale. The Univ. Athletic Club of New York invited a rules committee to revise the laws of the game, which is now less rough and more scientific. Professionalism in F. has never prospered in the States. The teams are composed of eleven men. The ground is 330 ft. long by 160 ft. wide, and is divided by chalk lines into squares of 15 ft. side, leaving a 5-ft. strip clear on each side, parallel with the touch line. The middle line and two lines, 25 yds. from each goal line, are made wider than the others. The goal is composed of two uprights more than 20 ft. high, 18 ft. 6 in. apart, and joined by a crossbar at a height of 10 ft. The ball is the same as an Eng. Rugby ball. There are seven forwards (two guards, two tacklers, two ends, and a 'centre-rush' or 'snapper back'), a quarter-back, two half-backs, and a full-back. A touchdown (a Rugby try) is 5 points, a goal 6 points (1 point more for conversion of a touchdown), a goal from the field 4 points, and a 'safely' (an Eng. Rugby touchdown) 2 points. A man is offside as in Eng. Rugby, but is put outside when the ball strikes the ground. The quarter-back is the general of the side; it is he who shouts the code words and commands which inspire the 'tricky plays,' such as the 'fake-kick,' the 'wing-shift,' 'double passes,' 'false passes,' 'delayed runs,' etc. In order to prevent blocks it was enacted that 10 yds. must be made by one side in three successive attempts. The great feature of Amer. F. is the 'interference' which is allowed; the game resolves itself into a series of scrums interspersed with runs and kicks. Each man faces his opponent in the scrum, and thus a species of man to man contests is continually going on. Another feature of Amer. F. is the 'shift,' a tactical manoeuvre entailing a sudden change of formation; various shifts have been developed but were regulated by rules after 1922. The principle of substitution of one player for another in the course of the game is admitted. Development has been towards transforming the Eng. Rugby code into an intricate and partly standardised system of tactical play. See M. Shearman and J. E. Vincent, *Football, its History for Five Centuries*, 1885; A. M. Weyand, *American Football*, 1926; W. W. Wakefield and H. P. Marshall, *Rugger*, 1927; W. J. A. Davies, *Rugby Football*, 1928; C. M. Buchan, *Association Football*, 1928; H. B. T. Wakelam, *Rugby Football*, 1935; F. N. S. Creek, *Association Football*, 1937; E. H. Sewell, *Rugger, the Man's Game*, 1947.